MARINE REVIEW

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OPPOSED TO BUILDING WARSHIPS IN NAVY YARDS.

Strong opposition to the acceptance of the house amendment to the naval appropriation bill providing for the construction of battleships, armored cruisers and gunboats at government navy yards will be met with from the navy department itself. A communication will be forwarded to the senate naval committee urging the rejection of that clause. Secretary Moody has the same views on the question of building ships at navy yards that were held by Secretary Long, and will support the recommendations of the bureau chiefs who are unanimously against the proposition. Admiral Bowles says that over $500,000 would be necessary to equip the Portsmouth, New York and Norfolk navy yards for battleship building, and at Boston even more, as this yard has not yet the equipment of other yards and could not build battleships, even with increased appropriations, under two or three years. Admiral Bowles holds that, regardless of the expense incident to improving the yards, the government can build better and cheaper warships in less time under private contract. The navy yards, he holds, are primarily for repair work; and to begin the construction of vessels at any of them would necessitate not only an immense increase of force but would interfere with speedy work upon ships requiring overhauling.

RIVER AND HARBOR BILL AGREED UPON.

The river and harbor bill has been agreed upon in conference. As it passed the house it carried an appropriation of $60,000,000; as it passed the senate it carried an appropriation of $70,000,000; the conference committee has compromised on $65,000,000. The issue as to the length of the extension of the Cleveland breakwater was settled by the adoption of the following amendment:

"Provided further, that the said breakwater shall be commenced at the easterly end thereof and shall be extended easterly so far as the same can be completed with the money available, in one section, or in separate sections, as shall be most favorable for the prosecution of the work."

This eliminates direct mention of either Case avenue or Gordon park as the terminus of the breakwater. The senate amendments increasing the appropriation for Ashtabula harbor, Lake Erie, from $135,000 to $200,000 and the appropriation for Huron harbor from $25,000 to $40,000 were agreed to in conference. Other appropriations for Lake Erie ports are: Lorain, $6,000; Toledo, $15,000; Port Clinton, $5,000; Sandusky, $125,000; and $175,000 for a dredge on Lake Erie, the money to be taken in proportionate sums from appropriations already authorized for Cleveland, Toledo, Sandusky, Fairport, Ashtabula and Conneaut.

CONSTRUCTION OF COMPENSATING WORKS SUSPENDED.

A special from Sault Ste. Marie announces that work on the compensating works, known as the dam at the rapids, which has been carried on for over a year, has been suspended for the reason that it has been so far completed to meet present requirement, the structure built damming water so much that the extra drainage of the lakes by the canals is counteracted It is now a complete dam as far out as the end of the second span of the International railway bridge.

Some time in the future, when a new power canal is built, the compensating works may be further extended. They have been commenced so that they can, if necessary, be extended across the rapids and are extraordinarily strong. These works are a part of the general scheme that the government required on the part of Clergue's interests in order to maintain the upper lake levels when the water is let into the big water power canal.

To date this work has cost the Consolidated Lake Superior Power Co. $250,000. It is unique from the fact that the same general plan of construction will likely be followed at Niagara Falls when it becomes necessary to equalize the flow over the falls to maintain the level on Lake Erie which is in danger of being lowered from various causes.

ANOTHER PLAN FOR HATTERAS LIGHT.

Capt. A. F. Eells, a Boston man, is the latest engineer to design a lighthouse for the treacherous Diamond shoals, off Cape Hatteras. It is well known, of course, that this point has claimed more wrecks than any portion of the Atlantic seaboard. It is well known also that hitherto no lighthouse has ever been able to weather the storms of Hatteras. A proposition has recently been presented to congress, which is said to have the approval of eminent engineers of the country, providing for a lighthouse on the shoals at a reasonable expenditure. Already the bill has passed the senate and it will probably be favorably reported to the house. It provides a lighthouse on the shoals to be in not less than 30 ft. of water, with a base sunk not less than 15 ft. into the bottom, and built of concrete to extend not less than 20 ft. above the water at high tide. The base of the foundation is to be 70 ft. at the bottom, 30 ft. at the water line and not less than 27 ft. in diameter above the sea. A circular steel structure for the quarters of keepers is to be above the masonry. On top of all this is to be a steel tower or mast containing a spiral stairway extending to a height so that the light shall be at least 200 ft. above the water line. The bill appropriates $30,000 for the lighthouse, and provides that after two years' operation an additional sum of $275,000 be paid Eells. In the opinion of the Review, the most satisfactory system yet devised for the marking of the Diamond shoals is the lightship No. 72, built by the Fore River Ship & Engine Co., Quincy, Mass.

It is understood that the Merchants & Miners Transportation Co. of Baltimore is in the market for two new steamers.

PURCHASE OF CHINA MUTUAL STEAM NAVIGATION CO.

The China Mutual Steam Navigation Co., Ltd., has been purchased by Mr. Alfred Holt, managing director of the Ocean Steamship Co. Mr. Holt now controls a fleet of forty-five steamers, having a tonnage exceeding 200,000. Following is the Mutual company's fleet:

Steamers.	Tons deadweight capacity.	Steamers.	Tons deadweight capacity.
Hyson	9,170	Kaisow	6,060
Yang-tsze	9,170	Oopack	6,000
Ping Suey	9,170	Ching Wo	6,000
Moyune	6,800	*Poyang	11,500
Teenkai	6,800	*Ningchow	11,500
Kintuck	6,600	*Oanfa	11,500
Pak Ling	6,606		
Total	106,870		

*Building.

Following is a list of the Ocean Steamship Co.'s fleet:

Steamers.	Net tons.	Steamers.	Net tons.
Achilles	4,484	Ixion	2,272
Agamemnon	4,462	Machaon	4,277
Ajax	4,478	Menelaus	3,006
Alcinous	4,278	Nestor	2,386
Antenor	3,563	Orestes	2,992
Beagle	100	Patroclus	3,540
Calchas	4,279	Peleus	4,800
Calypso	339	Prometheus	3,583
Dardanus	2,992	Pyrrhus	2,282
Deucalion	4,476	Saladin	1,140
Diomed	3,005	Sarpedon	3,023
Ganymede	236	Stentor	4,308
Glaucus	3,592	Sultan	1,270
Hebe	346	Tantalus	2,282
Hector	3,006	Tydeus	4,800
Idomeneus	4,299	Ulysses	2,282
Total	96,186		

In their annual report, submitted to the stock holders in March, the directors of the China Mutual said:

"In view of the extension of the company's operations and to meet the universally expected increase of trade with the far east the board contracted for the building of three large and powerful twin-screw steamers, Poyang, Oanfa and Ningchow, for delivery during the current year. It is confidently expected that these vessels will materially contribute to the profitable working of the company."

The directors submitted the general balance sheet and profit and loss account for the year ending Dec. 31, 1901, as follows:

The net profit, after providing for the general expenses of the current year, directors' fees, income tax, interest, etc., amounts to	£94,245	15	5
An interim dividend of 3 per cent on the preference, ordinary and ordinary "B" shares was paid on Oct. 1, 1901, amounting to	15,062	8	0
Leaving a sum of	£79,183	7	5
Which it is proposed to apply as follows:			
To the credit of "purchase account" of steamers	£40,000	0	0
To the credit of "equalization of dividends account"	20,000	0	0
To the payment of a further dividend of 3 per cent, making 6 per cent for the year on the preference shares	5,020	16	0
To the payment of a further dividend of 4 per cent, making 7 per cent for the year, on the ordinary shares (£5 paid)	3,347	4	0
To the payment of a further dividend of 3 per cent, making 6 per cent for the year, on the ordinary "B" shares	7,531	4	0
Balance to be carried to new account	3,284	3	5
	£79,183	7	5

PACIFIC COASTING TRADE DULL.

Mr. A. M. Dollar, writing to the Review from San Francisco, says that while the coast is generally prosperous there are a great many steamers laid up at the present time awaiting charters. Foreign trade is very dull just now, practically no charters offering. The coasting trade continues very good except in coal, the use of oil having reduced the consumption of coal so much that several colliers are laid up. The following vessels are disengaged at San Francisco at the present time:

	Gross tons.		Gross tons.
Arab	4,216	Asuncion	2,196
Folmina	3,638	Barracouta	2,152
Ohio	3,448	Progresso	1,919
Pennsylvania	3,343	Costa Rica	1,783
San Mateo	2,927	City of Panama	1,490
Kirkdale	2,873	Czarina	1,046
Washtenaw	2,897	South Portland	622
Zelandia	2,730	Homer	501
Colon	2,686	Albion	319
Tellus	2,529		
Indiana	2,335	Total	45,650

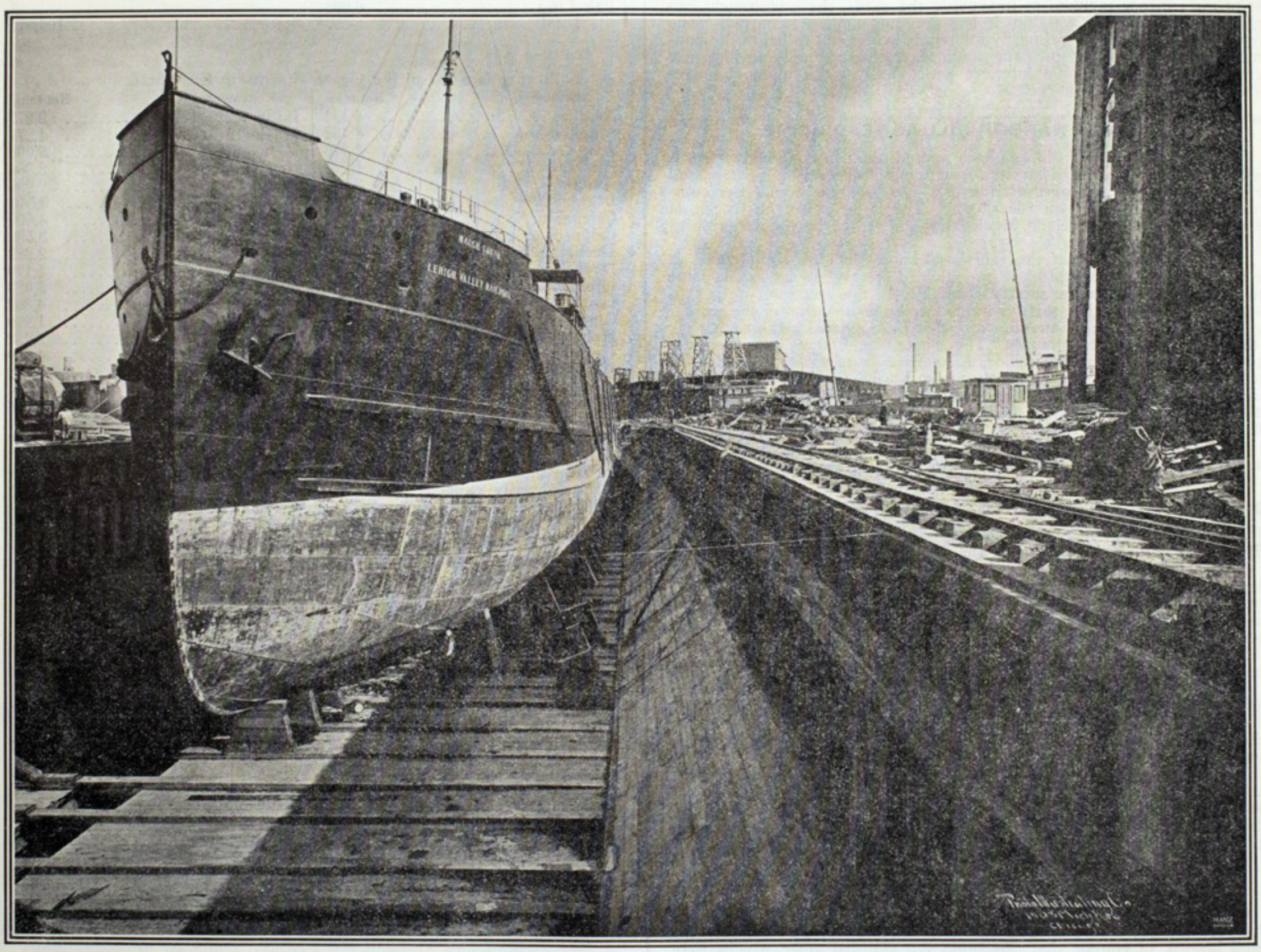
THE SHIP OWNERS' DRY DOCK CO.

Readers of the Marine Review will be interested in the two views shown in this issue of the new yards and dry dock of the Ship Owners' Dry Dock Co. on the north branch of the Chicago river. This company was organized a little over a year ago to take over the business of Miller Bros. on the south end of Goose island. Its officers are C. A. Macdonald, president; J. J. Rardon, vice-president; D. J. Smallwood, secretary and treasurer. Among the directors are M. A. Bradley of Cleveland, E. H. Fishburn of Ogden, Sheldon & Co., Chicago, and E. Mora Davison of August Belmont & Co., New York. It took possession of the property on April 1, 1901, and since then has completely rebuilt and refitted the yard, put up new buildings, torn down old ones, rebuilt and strengthened its entire dock line, which extends on three sides of the property, built a new dock, which is described below, added shear legs capable of lifting the largest and heaviest boilers and other large pieces and installed a very complete outfit of machinery for steel work, including the longest and heaviest rolls on the lakes. All this has been done without interfering with the business of repairing wooden vessels, which was taken over with the yards.

The new dock, which is shown in views herewith, is at the junction of the canal and river, so that large vessels coming to the dock can enter it without turning. It is 486 ft. long, 84 ft. wide, and 16 ft. deep. The gate is of wood, 60 ft. at top and 58 ft. at bottom, and has five valves. Timber for the gate was specially imported. Oregon fir, long enough to be made without scarphed joints. Two 28-in. centrifugal pumps, driven by two Westinghouse compound automatic engines, empty the dock in 1½ hours, discharging 6,000,000 gallons in that time. A standard gauge railway track surrounds the dock and two locomotive cranes operate on this track, each having its jib long enough to reach the center of the dock.

Perhaps the most interesting portion of the dock to ship builders is the construction of the dock itself. As will be seen in the illustrations, the usual altars are conspicuous by their absence, the sides being constructed vertically of piles, stringers and sheathing, tied back 40 ft. through two continuous rows of piles. This method of construction was the subject of much criticism during the building operations, the critics claiming that the vertical walls would not stand the pressure to which they would be subjected. The contractor, Mr. Edward Gillen of Racine, Wis., has, however, produced as tight a dock as there is on the lakes. The advantages of being able to put so large a dock in so limited a space and at the same time give plenty of room to work in at the bottom, and reducing the length of the cranes that serve the dock, made the experiment well worth attempting, and its success a matter of considerable moment to all ship builders who are cramped for land in their yards. Had the dock been built of the usual form, it would have been twice as wide to obtain the same capacity at bottom, and its location in its present position would have been impossible. One of the views shows the dock with the steamer Mauch Chunk, which has 381 ft. length of keel and 51 ft. 6 in. beam. It will be seen that there is plenty of room below, while the tracks for the crane are quite close to the vessel.

Since March 1 the company has repaired the following vessels: Australia, Chemung, Mauch Chunk, P. D. Armour, G. G. Hadley, Cuba, Oregon, Nirvana, Conneaut, Mautenee, Geo. J. Gould and Santa Maria. With dry docks of 150 ft., 300 ft., and 486 ft., and equipped for wood and steel repairs, this company has found so much repairing on which to run the yard that it is now definitely stated that the construction of new ships will not be undertaken, at least for a long time to come.



NEW DRY DOCK OF SHIP OWNERS' DRY DOCK CO., CHICAGO.
Length, 486 ft.; width, 84 ft.; depth over sill, 16 ft.

NOTES FROM KINGSTON.

Kingston, Ont., May 29.—The steamer Valeria is in the Davis dry dock getting a new shaft. When near Clayton a break occurred in the deadwood at her stern and the shaft became twisted and broke.

The Richelieu & Ontario Navigation Co.'s new steamer Montreal, on her way from Toronto to the metropolis, was here all day Sunday and was viewed by thousands. She will be taken to Montreal on Tuesday, Capt. George Batten of Kingston piloting her. This feat will mark an epoch in St. Lawrence river navigation. The steamer is 380 ft. in length, and will be the longest vessel ever taken down the rapids. She is worth $400,000, is sumptuously furnished, and will engage in the passenger traffic between Quebec and Montreal.

Hon. Wm. Harty, M. P., Henry Mooers, George Richardson, Edward Mooers and Thomas Donnelly of Kingston have been incorporated as the Frontenac Cereal Co., with a capital of $600,000. They will absorb the Frontenac Milling Co. and the Kingston Elevator and Transit Co., and will make large shipments of grain, exporting cereals to all parts of the world.

Eighty machinists at the Kingston Locomotive Works have been out on strike for three weeks. They object to ironworkers and apprentices doing machine work. All attempts at a settlement have so far failed. Twenty machinists from Glasgow, Scotland, will be brought here by the company, who have orders ahead for twenty locomotives.

The steamer Rosemount and consorts, the two steel barges Quebec and Hamilton, brought 218,000 bushels of wheat from Fort William to Kingston for the Montreal Transportation Co. This is the largest cargo that ever arrived in Kingston harbor by a single tow.

OUR NAVAL FIGHTING STRENGTH IS LOW.

Rear Admiral Charles O'Neil, chief of the bureau of ordnance, in a recent speech before the New York Yacht Club, describing the vessels of the United States navy, said:

"The navy list of January 1, 1902, contains the names of 243 completed vessels and of sixty in process of construction, a total of 303 vessels, and a very respectable showing, so far as numbers go. The question is, what are these 303 vessels and how many of them have any real military value? Of the completed vessels I find that eight are unserviceable wooden ships of ancient date, which will probably soon be sold to the highest bidder. One is an old iron, paddle-wheel steamer, the Monocacy, which has been in Chinese waters for over thirty years and ought to have been in the scrap heap years ago. One is the Spanish cruiser Reina Mercedes, which was sunk by the Spaniards at Santiago de Cuba, was afterwards raised, and of which it is proposed to make a sailing training ship; six are old wooden frigates, used for receiving ships; thirty-nine are tugboats; one is the so-called dynamite cruiser Vesuvius, having no military value; one is the ram Katahdin, a pronounced failure; five are purchased steamers, used as training ships for landsmen and having no military value; eight are old-fashioned wooden sailing sloops of war, used by the naval militia and for state marine schools; two are wooden training ships for apprentices; one is a small sailing practice vessel for the cadets at Annapolis; six are old single-turreted monitors with cast iron, smooth-bore guns, relics of the civil war, and of no value; sixteen are colliers; ten are supply vessels, tank steamers, and refrigerating ships; forty-eight are little gunboats, varying from 400 to 500 tons, mostly captured or bought in the Philippines, and twenty-eight are torpedo boats, only useful for special purposes. That is to say, that 181 of the 242 completed vessels now on the navy list have practically no fighting qualities; in fact, absolutely none, if we may except the torpedo boats. Of the sixty-two remaining vessels, ten are battleships; two, the New York and Brooklyn, are armored cruisers; fourteen are second and third-class cruisers like the Chicago, Baltimore, Cincinnati and Detroit; thirty are small cruisers and gunboats like the Yorktown, Nashville and others, and six are double-turreted monitors, suitable only for harbor defence. Of these sixty-two vessels, at least thirty are so insignificant that they would cut but little figure in a war with any strong power. Thus it will be seen that our effective fighting power today is about thirty-two vessels; hence we can lay no claim to any great importance as yet as a naval power.

"Fortunately we have a very respectable building program now under way, as the ships now building will equal in fighting efficiency all the rest of the navy. Of the sixty vessels now under construction, eight are first-class battleships; three are large armored cruisers, much more powerful than the New York; six are partially protected cruisers of 3,200 tons displacement; four are harbor-defence monitors; sixteen are torpedo boat destroyers; ten are torpedo boats, and seven submarine boats. We may safely add twenty-seven of the above vessels to our thirty-two of today, which will, in about three years' time, give us fifty-nine good fighting vessels, eighteen of which will be battleships, eight armored cruisers, ten monitors, and about twenty-three protected and partially protected cruisers; and we shall also have about fifty-seven torpedo vessels and a lot of small gunboats and miscellaneous auxiliary craft, useful in their proper sphere. From the foregoing it will be seen that we are deficient in powerful fighting vessels, and it behooves us to push on with the construction of battleships and armored cruisers until we have a respectable number of each, not wasting our energies or money on a lot more miscellaneous small craft until we have accomplished the more important construction."

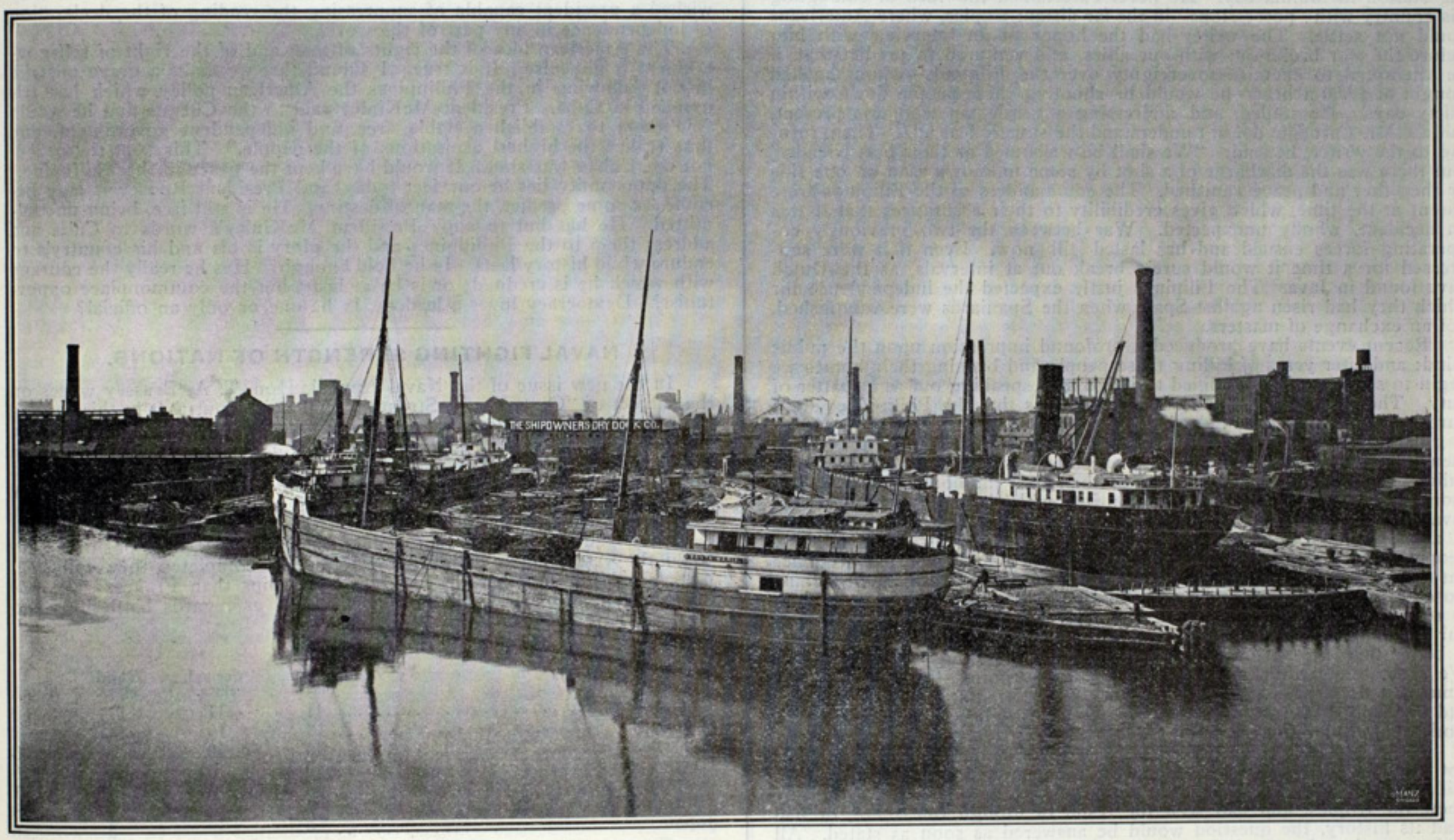
SHIP BUILDING IN PHILADELPHIA AND VICINITY.

Philadelphia, May 28.—One of the most interesting launches from the lower Delaware river ship yards was that of the steamship Maryland by the Harlan & Hollingsworth Co. at Wilmington last Saturday. The vessel is a fine steel side-wheel craft, designed for the fast Chesapeake bay service of the Baltimore, Chesapeake & Atlantic Railroad, and will run between Baltimore and Claiborne, Md., in connection with the railway service. The Maryland is 160 ft. long and will average 16 knots an hour. Miss Dora Dennis, daughter of T. Upshur Dennis, one of the directors of the railroad, was sponsor for the new ship, and the ceremony passed off in a manner highly creditable to the builders. A large number of prominent Baltimoreans attended the launch.

The new steamship Kroonland, building by the Cramps for the International Navigation Co., will have her trial within ten days. She is scheduled to sail on her maiden voyage from New York on June 28 and is now practically complete. The Kroonland is the most elegant craft in her interior appointments ever turned out by a ship building concern on these waters and has already secured for the Cramp company unstinted praise from ship builders generally. It is the intention of the International Navigation Co. to duplicate the Kroonland and Finland within a reasonable period. It is the understood policy of this company that it will in the future adhere to transatlantic steamships of large cargo capacity and moderate speed, but at the same time having sufficient speed to warrant the most luxurious passenger accommodations.

The strike in the anthracite coal region is beginning to have its effect upon local shipping. A very large amount of coal mined in the Pennsylvania districts is transferred to this city, loaded on schooners and barges and shipped to New England and southern ports. The mines being tied up, no shipments are made to this city and the vessels are consequently lying idle at their docks. At Port Richmond there is an entire fleet of coal barges owned by the Philadelphia & Reading. They are all tied up and their crews have been laid off indefinitely. This situation applies also to many of the schooners engaged in the southern coastwise coal trade, their owners claiming that it does not pay to send them in ballast, south, to return with lumber.

Another change has been effected at the League Island navy yard, in which Rear-Admiral James H. Sands succeeds Rear-Admiral Wadleigh as commandant. For three years, until last September, Admiral Sands was governor of the Naval Home in this city, when he was transferred as president of the Naval Retiring Board at Washington. During his stay in Philadelphia, Admiral Sands made many friends among the shipping fraternity and by whom he will be cordially welcomed back.



VIEW OF SOUTHERN END OF SHIP OWNERS' DRY DOCK CO. PLANT, CHICAGO, SHOWING TWO OF THEIR DOCKS AND SHEARS.

The navy department is anxious to have printed as a public document the history of the Boston navy yard prepared by the late Rear Admiral George Henry Preble. It covers the period from 1800 to 1875, and contains a valuable record of the principal operations of this yard, as well as a large amount of matter of historical value to the navy. Admiral Preble was devoted to naval history, and his manuscript is written with great fulness and accuracy of detail. The Preble manuscript is now in the possession of Rear Admiral M. T. Endicott, chief of the bureau of yards and docks.

The new steel tow barge for Clergue interests, now on the stocks at the ship yard of the Collingwood Ship Building Co., Collingwood, Ont., will be named Agawa. This barge is 389 ft. over all, and it is expected will be launched about June 15.

THE OPPORTUNITY OF THE UNITED STATES.

Andrew Carnegie in the North American Review for May.

The American people are at last learning the truth about the Philippine situation. At this moment they are shocked at the perpetration of such atrocities as have rarely appalled civilized man, the proof of which is found in the testimony of four of our own officers, trusted men of honor. Fortunately, the president and Secretary Root are aroused and resolved that the good name of the American people is not to be thus foully stained. The guilty will be punished. Gen. Kitchener, in South Africa, has shown them how he deals with savagery in war—two Australian butchers of prisoners have been shot. If Gen. Smith has not been libeled by the four officers who agree about his orders, "Kill all over ten—take no prisoners—burn and slay," what is the commander-in-chief going to do with him? But all these details, sickening though they be, are only of passing moment compared with the problem which confronts us. We now learn from the commanding officer that in Samar the people are now more intensely aroused against us than they were at first. Has not the time arrived for the president and cabinet to consider our position in these islands? The president inherited the *damnosa hereditas*. So did Secretaries Root, Moody, Shaw, Knox and Payne. These men are to be pitied, and no one with a modicum of sound sense would hold them responsible for the serious situation. It is one question whether one should plunge into an unknown stream; quite another when one sees one's friends in mid-stream, struggling with the dangerous current and liable to be overwhelmed, and plunges in to save them.

In a moment of aberration, and against the calm decision arrived at with the hearty approval of his cabinet, President McKinley suddenly reversed his policy. His first decision was merely to get a suitable coaling station in Manila bay. He never entertained the idea of entangling his country with "possessions" in the far distant tropics, where Americans could not settle. The writer had the honor of an interview with him before the war broke out with our allies, and ventured to predict that, if he attempted to exercise sovereignty over the Filipinos—whom he had bought at $2.50 a head—he would be shooting these people down within thirty days. He smiled, and, addressing a gentleman who was present, said: "Mr. Carnegie doesn't understand the situation at all." Then, turning to the writer, he said: "We shall be welcomed as their best friends." But there was the discharge of a shot by some unknown man on one side or the other and peace vanished. The commanders of the Filipinos were absent at the time, which gives credibility to their assurances that it was an accident, wholly unexpected. War between the two previously cooperating forces ensued and has lasted till now. Even if it were suppressed for a time it would surely break out at intervals, as the Dutch have found in Java. The Filipinos justly expected the independence for which they had risen against Spain when the Spaniards were vanquished, not an exchange of masters.

Recent events have produced a profound impression upon the public mind; and after years of killing these people and burning their homes we begin to see those best qualified to judge now speaking out as a matter of duty. The president himself has told congress that the Philippines are a burden—a great burden, indeed, they are and must be. The loss of life is great, both of American and Filipino. The ruin of the health of our men is certain. Judge Taft is only one of many who returned to us invalid. The cost in money is not less than sixty millions per year. But more than all this is the false position into which we have drifted, as the invaders of a civilized Christian land, using force against the aspirations of a people for a country for which to live, or, if necessary, to die. A people which has shown itself willing to fight and die for independence has earned the right to a trial of it. Upon this point President Schurman closes his instructive message with this truly American sentiment: "And, to repeat what ought not to need repetition anywhere within the limits of our free republic, any decent kind of government of Filipinos by Filipinos is better than the best possible government of Filipinos by Americans." We seem to hear the voices of the fathers echoing this statement of American doctrine—Washington, Franklin, Jefferson, Hamilton, Adams, and the voice of one who ranks even with these—Lincoln, who held that God never made a people good enough to rule over another people.

The American people need only to be satisfied upon one point: Is it not our duty to continue forcing our rule upon these six and a half millions of Christian people, for their good? If all our people really knew the tropics, and had seen the result of foreign rule there, or had read its history, the question would be answered as soon as stated. All history teaches that the influence upon the inferior race of such members of a superior race as go to the tropics is injurious to both. Where a superior race can go freely and settle a land hitherto inhabited by an inferior race, as our race settled here among the Indians, genuine good is done—but even then not to the Indians, but to the cause of civilization as a whole. It is a step in advance. To a superior race no portion of the earth is closed which it can populate and which it can make its dwelling place. If Americans could and would go, in great numbers and of all classes, and make their permanent homes in the Philippines, their doing so would undoubtedly result in progress there; but it would involve loss to our own land, which needs all its people and all proper people who can be induced to come here, for we have only thirty-two people to the square mile, while England and Wales have 502. We have a rich continent of our own to develop. As a matter of fact there will go to the Philippines a few male adventurers, who, not being able to succeed here, will try abroad. There will have to go 40,000 soldiers; but let any one who has traveled the tropics tell you of the malign influence an army has upon the natives and of the not less serious influence exerted upon an army by its situation there. Contact is ruinous to both races. I have traveled round the world and talked to many people in the tropics. India is a good illustration of the rule of our race over alien races. The British are best governors of dependencies, and they have been in India for more than 200 years, time enough, one should think, to educate a people sufficiently to give them a trial of self-government. Yet, if Britain left India today, she would leave behind scarcely a trace of her influence. Railroads, telegraphs and canals would remain, which might not have been so extensively built but for the British occupation—though even this may be doubted, for the independence of a people stimulates action and insures progress. Britons can not grow in India. The few merchants and members of professions who seek their careers there must have seasons out of that climate. British children can not be successfully reared there. Soldiers must be transferred, as ours are to be every three years from the Philippines. Therefore the races remain apart. One knows nothing of the other.

There is another important point. After 200 and more years of occupation it is still necessary for Britain to keep 70,000 British troops in India, besides many Indian troops which are sent to regions far from their native homes, so as to be among strangers, and therefore trustworthy as oppressors. And, pray, let my readers mark this: Not one piece of artillery is given to any native regiment. That would never do. Why? Because no invader can ever trust the oppressed not to strike when opportunity offers. The aspirations of a people for self-government may be suppressed for a time, but seldom if ever eradicated. We all remember the fearful mutiny. Britain sits today upon a volcano. Many of the educated Indians have learned English in the schools. Those to whom I talked, knowing I was an American and not a Briton, quoted American ideas, and referred to Washington and the war for independence, and always ended by saying: "Some day we shall be free like you." It was a crime to teach the slave to read—a mistake to teach the people of India English. We prohibited the reading of the declaration of independence in the Philippines last Fourth of July. To the incredulous reader let me repeat this fact. It is on record and acknowledged by our officials. We can imagine the first thought of so good a man as Judge Taft and so good an American as he has been hitherto when this was suggested to him. "Is thy servant a dog that he should do this thing?" But, alas, he did it!

We are engaged in work which requires suppression of American ideas hitherto held sacred. If the republican candidate for the presidency, even if it were President Roosevelt himself, popular as he is, could be taxed with having approved this next Fourth of July he would probably be defeated in the next campaign. Were I of the democratic party I should base the campaign largely upon this order, and ask the people if they wished a president capable of suppressing the reading of the declaration of independence in any part of the world.

The American idea of the rights of man and of the right of self-government is not false. It is true. I submit that we make a grave mistake in not following in the Philippines the American policy which has triumphed in Cuba. President McKinley said to the Cubans that he would "aid them to establish a stable, free, and independent government, and thus realize the highest aspirations of the people." This kept the peace; not one Cuban was shot. It would have kept the peace in the Philippines. The opportunity lies at our feet today, and President Roosevelt may become, as some predict, the man of destiny. He is still free, being uncommitted. He has but to copy President McKinley's words to Cuba and address them to the Philippines and the glory is his and his country's to endure while history lasts. Is he bold enough? Has he really the courage with which he is credited; or is he at heart but the commonplace opportunist? Democracy loves a leader. Is he one or only an official?

NAVAL FIGHTING STRENGTH OF NATIONS.

In the new issue of the Naval Annual, Hon. T. A. Brassey writes on the subject of "Comparative Strength" and points out that in this respect considerable modifications have recently taken place. Ten years ago the only navy that could bear any comparison with that of Britain was France. Next to France came Russia, and then Italy; Germany and the United States were almost negligible quantities, while the Japanese had scarcely begun to construct a fighting fleet. But much has happened since then. France and Italy have dropped back relatively to other powers. Russia, Germany and the United States have all improved their position, and when the vessels now building for them are completed they will each possess a larger number of first-class battleships than France. The following tables show how all the powers stand as regards battleships and cruisers, built and building:

BATTLESHIPS.

	First class.	Second class.	Third class.	Total.
Great Britain	41	11	17	69
France	13	10	15	38
Russia	15	10	8	33
Italy	9	5	2	16
Germany	16	—	15	31
United States	17	—	11	28
Japan	6	—	2	8

CRUISERS.

	First class.	Second class.	Third class.	Total.
Great Britain	49	62	46	157
France	19	23	13	55
Russia	16	7	8	31
Italy	5	5	11	21
Germany	6	8	20	34
United States	13	10	11	34
Japan	6	10	8	24

The following from Engineer of London is interesting: "A dispute is now going on as to who invented wireless telegraphy. The real inventor—though none of the disputants seem to know it or mention it—of wireless telegraphy for practical use was an officer on the British torpedo school ship Vernon. This was many years before Marconi. The admiralty of the day refused to sanction any expenditure on the research, which was then carried on at the private expense of a few officers who were interested. A practical proficiency was obtained; also an admiralty verdict that the thing was no good. It was then dropped, the experimenters having, we believe, exhausted their available resources. Some years later, Marconi, working independently, went over the same ground, produced and patented his system. The admiralty then bethought them of the Jackson system, which was tried in the 1900 maneuvers. A certain 20 miles and an uncertain 40 miles was reached, but the system failed because progress was possible only by infringing Marconi patents. The incident in no way detracts from Marconi's glory, as it is highly improbable that he had even heard of the Jackson system till his own was perfected."

THE VIKINGS AND THEIR CRAFT.

(From Syren and Shipping, London.)

Not a little of the love of the average Briton for the sea is the hereditary gift of those brave and hardy pirates and traders, the Vikings. As with the former inhabitants of ancient Egypt and Etruria, is is the spade which has done much to disclose the life history of these intrepid sea rovers. Their arms, their clothing, their ornaments and their ships have all been rescued from the friendly clay or peat beneath which they have lain for centuries, and these relics of a barbaric past, together with the saga and edda literature and the not inartistic rock drawings, spell in pretty accurate language the life and customs of a people whose influence on the English temperament is well marked even today. The Norsemen, as they are sometimes generically called, were essentially a maritime people to whom the sea called with irresistible voice. To them the North Sea with its affiliated waters was not a barrier, but a highway, leading to Northern Russia, Iceland and Greenland; to England, Ireland, France and even the remoter countries of the Mediterranean. The Norsemen reaped the harvest which their more peaceful victims sowed, and that they did so was as much due to the excellence of their ships as to their own daring and enterprise. Like the shipping of today, the Viking ships fulfilled four distinct purposes. There were war vessels, cargo carriers, passenger or ferry boats, and a boat of fine design, specially intended for rapid sailing—the prototype of the modern yacht. As to the size and construction of the Viking ship, the statements of the heroic records of Harald Bluetooth, of Knut the Great, of Hakon Jarl the Great, Hakon the Good, Olaf Tryggvason and St. Olaf, are amply illustrated by the various archæological finds which have been made of exhumed ships, dug out of bog, together with countless other relics of these ancient seafarers. The highest development of the naval architecture of the Vikings was attained in the "serpent" or war vessels. These were generally constructed of oak, were clinker built and were propelled with sails or oars. A good example, though small, of these ancient craft, is the Gokstad ship, dug up at Sandefiord, near the entrance to the Christiania Fiord. This vessel if 78 ft. long, 16 ft. 7 in. beam, with a depth of 5 ft. 9 in., the keel being 57 ft. in length and 14 in. deep. On either side was a row of shields designed to form a sort of raised bulwark to protect the rowers who tugged in twos or threes at the 25-ft. to 40-ft. oars or sweeps, which projected through holes in the side of the ship, which could be closed by sliding oak shutters or panels in bad weather, or when the vessel was under sail. The mast was usually a substantial spar of pine, which could be lowered aft when the wind was not fair—that is, not right aft, for the sail was a square one. On the Gokstad boat was found the remains of three small boats, varying from 21 ft. to 12 ft. in length, two of them being masted. The sail was usually made of wadmal, a blanket-like cloth, and was often dyed, or lined on both sides with fur, or a gaily striped sort of velvet, which, with the painted hull with its dragon-head bow, gave the boat a peculiarly picturesque and formidable appearance. What the peaceful denizens of some seaside valley must have thought when they saw a fleet of these pirates, with their pennants flying and shields overlapping like the scales of a fish, can be readily imagined. Hard knocks and no quarter was the order of the day. The measure of length applied to these craft was the number of seats she contained. Thus the "serpent" of Knut the Great was a sixty-seater which, allowing, say, 3 ft. 6 in. between the seats, would, with the stem and stern portions, give a total length of 300 ft. or over. The celebrated Long Serpent of Olaf Tryggvason, which was quite 180 ft. in length, was divided by bulkheads between the rowing benches into thirty-four rums or rooms, a half-room accommodating eight persons, making, with the forecastle, etc., quarters for over 700 men. Usually, except in very high ships, there was no laid deck except at the raised forecastle and poop. Naturally, these craft, in spite of the cattle hair which tightened the joints, made some water, and to get rid of this two wells were provided, into which a man descended and passed the water in pails to those above. A leaky ship was justly regarded as unseaworthy, and the Norse law excused a crew from serving in a ship which required bailing three times in two days. As the voyages made by these craft were of uncertain duration the commissariat was a most important matter. The war vessels carried regular cooks, and as fires could not be lighted on board, the cooks, with their huge porridge pots, etc., were put on shore, when possible, to prepare food for all hands. Rowers and fighters would, under such circumstances, sleep some on shore in tents and others on board under awnings of skin. From a well-known saga we learn something of the quantity and variety of the food-stuffs carried to feed these crews. Svein of Denmark was chasing Harald, and the latter, to facilitate his escape, ordered his crew to throw overboard meal, wheat and pork, and also to cut holes in the ale barrels with the view of lightening the ship. Of the ale much was carried, and a barrel was always on tap for the thirsty rowers. Butter, hard bread and smoked or salted meats were also included in the stores, for hard working and harder fighting begot the healthiest of appetites. But the ships of these Vikings were more than mere fighting or carrying machines. The nautical sentiment was deeply woven into the religious and poetical feeling of the race. Modern language has no more poetical description of a swift steamer that styles her an ocean greyhound, but the boats of the Norse mariners were Serpents, Deer of the Surf, Mares of the Surf, Gulls of the Fiord, Sea Steeds, Ravens of the Sea, Snakes, etc. The oars were poetically described as "wave sweepers," "long arms," the "feet of the horse of the sea." The sails were "dragons' wings," "Odin's beard." etc., etc. Even the more humble and less puissant trader had a place in the national sagas, for was not Odin the god of cargoes? The "farman" and "kaupman" were honored members of the community, as well these sea traders and merchants might be when the length of their adventurous voyages and the valuable merchandise they brought home are considered. In sight of land navigation was tolerably easy. The crew landed each night, and he upon whom the lot fell cooked for the ship's company. Often weary weeks slipped by while waiting for a fair wind, for the byrding—the ship of burden—moved by sail alone. Out of sight of land there was the sun by day and the pole star by night to direct these hardy mariners, but in thick weather navigation was a work of difficulty, and yet the Norsemen colonized Iceland and Greenland, and voyaged along the eastern seaboard of the present United States, a feat more wonderful than those of Columbus or Cabot. Dried fish, tallow, furs and timber, were the outward freights of the Viking merchantmen, while homeward they brought cloth, silks, honey, linen, wheat, flour, wax and kettles.

AROUND THE GREAT LAKES.

Capt. George P. McKay of Cleveland has been notified from Canada that a gas buoy (a blinker) has been established on Grubb's reef, Lake Erie. The buoy is about ⅛ mile south (probably a little to the west) of the south end of the reef and is in 25 ft. of water.

It was of course a slip of the pencil in the last issue of the Review that caused the Chicago Ship Building Co. to be credited with a job of repairs on the steel steamer Mauch Chunk that was done at the works of the Ship Owners' Dry Dock Co. An illustration in this issue shows the Mauch Chunk in one of the docks of the Ship Owners' company.

About a month will be taken up in putting together at Quebec the parts of the first of the large ocean-going steamers built at the Cleveland works of the American Ship Building Co. and taken down the St. Lawrence in sections. The second steamer has not left Cleveland as yet. It is no small task to divide into two parts a 7,000-ton steamer, tow the parts from Cleveland to Quebec and then put them together again.

Col. William St. John, representing the Safety Car Heating & Lighting Co. of New York, was in Cleveland and Detroit during the past week. Col. St. John gives special attention to the Pintsch gas buoy business of the New York company. He says that improvements have been made in the bell buoy, operated by gas, upon which engineers of his company have been at work for a long time past, and he is quite confident that another trial of this type of aid to navigation in one of the lake channels will prove its success.

Probably no branch of the postal service in the country shows a greater steady increase than the business of the office that serves ships passing up and down the Detroit river. In the present season the number of pieces of mail received for delivery to vessels has far exceeded any previous year and there is constant increase. One day last week as many as 400 pieces were received in one mail. The increase of work has made another carrier necessary, and word has been received from Washington that, beginning July 1, another man will be allowed.

The Canadian government has decided to recognize the bravery of Capt. G. D. McDougall and the officers and crew of the Canadian Pacific steamer Athabasca, which went to the rescue of the United States barge Preston on Lake Superior June 29, 1901, and saved all on board. The government, through the minister of marine, has signified its intention of presenting Capt. McDougall with a handsome piece of silver, First Mate McPhee with a binocular glass, Chief Engineer William Lockerby with a gold medal, and the members of the crew with silver medals suitably inscribed.

At Duluth, a few days ago, a jury in the case of the United States against the Davidson Steamship Co. to recover $4,012.50, damages to the breakwater at Two Harbors, returned a verdict for the full amount. The steamer Shenandoah of the Davidson fleet collided with the new breakwater one night last June. The amount sued for represents the money needed to replace the injured cribs. The plaintiff alleged incompetence on the part of the ship's master, while the defense endeavored to show that the plaintiff had given no notice of any improvement having been made at Two Harbors and that the light that marked the end of the improvement was thought to be that of a vessel.

Arrangements of Messrs. Botsford, Jenks and Duncan of Port Huron with the Grand Trunk Ry. Co. for the construction of a large steel elevator at Point Edward, across the river from Port Huron, and for the development of a large freight carrying trade between the head of Lake Superior and Port Huron are temporarily in abeyance. Inability of the Port Huron parties to secure structural steel for the elevator was the first cause of a suspension of operations. Delay with the new enterprise does not, however, interfere with the package freight carrying arrangement which the Port Huron company has with the Grand Trunk and its boats in this line are plying regularly between Port Huron and Lake Superior ports. The Port Huron people are also proceeding with the work of establishing a steel ship building plant on the St. Clair river.

THE PACIFIC CABLE.

The increase of the capital stock of the Pacific Cable Co. from $3,000,000 to $12,000,000 is announced to be for the plans of that company for carrying out important construction work. At the offices of the Commercial Cable Co., which is under the control of the same men who will control the Pacific Cable Co., it was said that the contractors had already completed one-third of the cable required for the laying of the section from San Francisco to Honolulu. This line is expected to be laid and in working order by November of this year. It will be 2,078 miles in length. The plans are to continue the cable to Manila by way of Midway island and Guam. The distance from Honolulu to Midway island is given as 1,140 miles, from Midway to Guam, 2,293 miles, and from Guam to the Philippine islands 1,360 miles. The plan calls for the landing of the cable on the eastern shore of the island of Luzon, where connections will be had with Manila by a land line across the island. The total length of the cable line is 6,871 miles. The project of having the cable station on Wake island has been abandoned. The whole of the cable is being constructed in England, under a contract which calls not only for its construction, but for its laying and the putting of the line in working order. The contract provides that the construction company shall lay the cable which shall be maintained in working order for thirty consecutive days. It will then be turned over to the cable company. The several stretches of cable will make one ship load each. The cable laying steamer, which is one of the largest ships afloat, will carry a sufficient amount of cable in one cargo for the laying of the longest line, from Midway island to Guam. The line from San Francisco to Honolulu, which is to be laid before the end of the year, will also be carried at a single trip of this steamer. It is estimated the entire cost of the completed cable from San Francisco to Manila will be in the neighborhood of $12,000,000. This will include the various cable stations. The completion of the San Francisco-Manila cable will give a complete line under a single management from Europe to the United States, a trans-continental line from the Atlantic to the Pacific and a cable line from San Francisco to Manila. In all there will be in the neighborhood of 10,000 miles of cable and 5,000 miles of direct land lines. The line is expected to be completed and in working order to Manila some time in 1904.

The keel of the battleship Virginia has just been laid at the works of the Newport News Ship Building & Dry Dock Co., Newport News, Va.

SCOTLAND AND THE SHIPPING COMBINE.

Glasgow, Scotland, May 21.—It is hardly necessary to say that in Scotch shipping and ship building circles the text of the agreement between Mr. J. Pierpont Morgan and the White Star, Dominion, Leyland, International and Atlantic Transport lines has been discussed in all its details with much interest. And the general impression derived is that while the White Star and Dominion lines have made a good bargain, Harland & Wolff, the ship builders, have made a still better one. There has been nothing like the commotion here about the shipping combine that there has been in London, for the simple reason that Glasgow shipping people were able to estimate its limitations as well as its possibilities. There is an immense mass of tonnage outside the combination that no syndicate can control. It is not the big passenger liners who do the bulk of the transatlantic traffic, nor do monster steamers that have to be laid up most of the year represent the most profitable form of shipping property. But even as regards big passenger liners there are far more outside than inside the combine, and on the Clyde we have a dozen yards ready and able and eager to build any number of them. A combine of British ship builders, ship owners, and railway companies could easily be formed, if need be, to force the Morgan combine, who are by no means going to gobble all the trade. But it is doubtful if there is any one of our ship builders who would not be glad to have Harland & Wolff's share of the contract—the exclusive right of supplying and repairing ships, engines and boilers, for the combine for ten years, at a handsome fixed rate of profit and no risks. It is on the commission principle that the White Star boats, and many of those of our big lines have been built. Better results are obtained by confidential co-operation between builder and owner, and much saving is effected by giving the builder a free hand in carrying out an agreed plan. The contract with the Morgan corporation will debar Harland & Wolff from taking any more admiralty contracts, as they have to devote all the capacity of their works to the needs of the combine, so long as the combine can keep them fully employed. But they have not been on the admiralty list until lately, and the only admiralty order they have on hand is for a set of engines for one of the new battleships. They will not lose anything, therefore, by being placed out of the running for warship work. It is to be noted that they reserve the right to continue building for their old customers, the Hamburg-American company, who though not in the combine are in the working agreement.

The Cunard company will not join the combine and is much more likely to form an offensive and defensive alliance with the other Glasgow-owned companies, the Allan, Anchor and Donaldson, and also with the other Liverpool-owned companies, whose operations and ramifications are not so well known. It is perhaps not generally known in the United States that the Cunard company has always been controlled from Glasgow, though for business purposes its head offices are in Liverpool. The late Sir George Burns, his son, the late Lord Inverclyde, and his grandson, the present Lord Inverclyde, have been the successive heads of the concern—all with their homes and offices here. It is just sixty-three years since Samuel Cunard came over to Glasgow from Halifax with an idea, which the late George Burns and the late Robert Napier, both of Glasgow, quickly materialized. Napier built the steamers. Burns raised the capital, negotiated the mail contracts and organized the business on this side. Cunard arranged the agencies and organized the business on the other side. In 1840 the Cunard company was formed with a capital of £270,000. On July 4 of that year the first vessel of the line, the Britannia, departed on her first voyage from Liverpool. Samuel Cunard went with her and it is recorded that on his arrival at Boston he received within twenty-four hours no less than 1,873 invitations to dinner. This dinner record has probably never been broken. The keenest competition the Cunard line has yet had to encounter from the American side was that of the Collins line, organized in New York about 1850. This was a big venture for the time, and it started with all the advantage of a substantial government subsidy, whereas the Cunard company had nothing but a moderate postoffice payment for mail matter carried. The Collins line was started with the object of sweeping the Cunard off the Atlantic. In eight years it was itself wiped out and the Cunard line continued to bloom, though since it became a joint stock limited company it has never paid high dividends.

The following is a list of the reserve or auxiliary merchant cruisers at the call of the admiralty, among whom a total sum of £63,000 is divisible in the fiscal year 1902-1903:

Vessels.	Gross tons.	Net tons.	I. H. P.
White Star line—			
Oceanic	17,274	6,996	28,000
Majestic	9,965	4,270	16,000
Teutonic	9,984	4,269	16,000
Cunard company—			
Campania	12,950	4,974	30,000
Lucania	12,952	4,975	30,000
Umbria	8,128	3,699	14,500
Peninsular & Oriental—			
Caledonia	7,558	3,529	10,000
Persia	7,951	4,198	9,400
Arabia	7,903	4,167	9,400
India	7,911	4,185	9,400
Orient company—			
Omrah	8,291	4,632	10,000
Ophir	6,910	3,223	10,000
Royal Mail line—			
Danube	5,946	3,425	6,650
Nile	5,946	3,425	6,650
Pacific company—			
Ortona	7,945	4,115	10,000
Canadian Pacific Co.—			
Empress of India	5,905	3,003	10,000
Empress of China	5,905	3,003	10,000
Empress of Japan	5,905	3,003	10,000

Note—An additional vessel is proposed by the Cunard company in lieu of the Servia, which has been sold.

In addition to the above the companies engage to hold the following vessels at the disposition of the admiralty without further subsidy:

Vessels.	Gross tons.	Net tons.	I. H. P.
White Star line—			
Britannic	5,004	3,152	4,900
Germanic	5,071	2,991	6,000
Gothic	7,755	4,975	....
Cymric	12,647	8,201	7,300
Medic	11,985	7,825	....
Cunard company—			
Etruria	8,120	3,690	14,500
Aurania	7,269	4,030	9,500
Ivernia	13,800	8,913	10,000
Saxonia	13,963	8,921	10,000
Peninsular & Oriental—			
China	7,912	4,166	9,400
Egypt	7,912	4,179	9,400
Himalaya	6,898	3,700	7,650
Australia	6,901	3,590	7,650
Victoria	6,527	3,454	6,080
Britannia	6,525	3,413	6,080
Arcadia	6,603	3,574	6,080
Oceana	6,603	3,574	6,080
Orient company—			
Ormuz	6,387	3,225	9,000
Austral	5,524	3,214	7,000
Orient	5,631	3,546	8,000
Royal Mail line—			
Thames	5,645	3,369	5,740
Clyde	5,645	3,377	5,740
Tagus	5,545	3,056	5,740
Trent	5,573	3,085	5,740
Magdalena	5,362	3,066	5,600
Atrato	5,366	3,069	5,600
Pacific company—			
Orizaba	6,298	3,384	6,000
Oroya	6,297	3,420	6,000
Oravia	5,321	3,318	4,200
Canadian Pacific Co.—			
Tartar	4,425	2,768	4,900
Athenian	3,882	2,440	4,600

Of special interest in connection with Atlantic shipping developments is the completion of the twin-screw steamer Columbia, launched in February by D. W. Henderson & Co., Ltd., Partick, for the Anchor line, and which ran her trials this week. This vessel is the largest and finest in the Anchor line fleet and one of the largest and finest to sail from and to the Clyde. She is 500 ft. in length over all, 56 ft. moulded breadth, 36 ft. depth, and of 8,400 tons gross—that is, about the tonnage of the City of Rome, but shorter by 60 ft., broader by 4 ft., and deeper by 6 ft. She marks the advantages gained by the progress in naval architecture since the City of Rome was built in 1881. The Columbia is to be an "eight-days boat," leaving Glasgow on Saturday afternoons and arriving at New York on Monday mornings, taking a week and a day on the voyage. On trial she did 18¼ knots easily, and can be depended on to cross the Atlantic to schedule time, although it is probable that at the first voyage the engines will not be driven at their maximum. The Columbia is a fine-looking vessel with straight stem and elliptical stern, two pole masts, schooner rig, and three tall funnels. She is divided into nine water-tight compartments. The passenger accommodation is distributed over six decks—first-class accommodation amidships, with staterooms for 216 passengers on the main and bridge decks; second-class also amidships, but nearer the stern, with rooms for 400 passengers; and 750 third-class passengers berthed on the main and 'tween decks. The first-class rooms are luxurious, and the saloons handsomely furnished and decorated, while the second-class staterooms and saloons are almost as comfortable. In the third-class the owners have provided unusual comforts for the voyage. The Columbia is now loading for New York and will be on her way across on her maiden voyage before these lines are in print.

From the famous yard of the Fairfield Ship Building & Engineering Co., Ltd., has just been launched a notable addition to the fleet of the Orient Steam Navigation Co., in whose steamer, Ophir, the Prince and Princess of Wales made their tour of the world. Most, if not all, of the Orient liners have been built at Fairfield, but this new one, named the Orontes, is the largest and most powerful vessel of the fleet. She is built with a straight stem and elliptical stern. There are six decks, with poop and forecastle, and a continuous promenade deck, 300 ft. in length. Above the promenade deck and extending over the poop is the boat deck. The vessel is built of steel throughout, to meet the requirements of the board of trade for passenger certificate, and also under special survey, and with scantlings as required by Lloyd's latest rules for the 100 A1 class. A cellular double bottom is fitted the full length, and holds are subdivided into separate compartments by water-tight bulkheads, with a strong collision bulkhead fitted forward. The holds are so divided that even if two of the largest were filled with water the vessel has sufficient reserve buoyancy to keep afloat with safety. Accommodation is provided for 320 first and second-class passengers, berthed on the main and upper decks, and for 320 third-class passengers on the lower deck. The cabin accommodation is of the most comfortable description. The fittings are all of the most modern and approved style and best quality. The first-class entrance is in the forward part of the ship on the promenade deck, and leads direct to the dining saloon, a spacious room lighted by a skylight and well from the boat deck, and by large square windows in the sides. Immediately forward is a handsome drawing room with writing rooms adjoining. Aft of the saloon entrance on the promenade deck is the first-class smoking room, having a direct entrance from the dining saloon, for convenience to passengers when the promenade deck is uncomfortable in stormy weather. Special talent is employed for the design and decoration of all these apartments. The second-class entrance is built on the poop deck, and leads to the second-class dining saloon on the main deck. The captain's cabin and officers' accommodation are fitted at the forward end of the boat deck, and the ship's office, dispensary, purser, and doctor's rooms are situated on the promenade deck aft of the engine room casing. The

accommodation for engineers is arranged in cabins amidships on both sides of the upper deck. The sanitary accommodation and lavatories have received special consideration and are of the latest and most approved description. An ample number of baths is provided for the passengers and crew. Steam heating is fitted throughout the ship, also a continuous water service; and a most complete system of ventilation has been adopted. There is a complete installation of electric light, and electric bells to the cabins, saloons, etc. A very large refrigerating plant and insulated chambers are provided for the storage of meat, poultry, milk, fruit, etc., also wine and vegetable rooms. The cargo hatches are equipped with seven patent duplex winches for the despatch of cargo; four of the winches are so arranged that they may be used for raising and lowering the boats. Steam steering gear is fitted, to be worked either at the engine or from the bridge, and reserve hand gear aft, with two large steering wheels. A steam windlass with warping ends and capstan is fitted on the forecastle deck, and two powerful steam capstans on poop deck for warping purposes. The Orontes is a smart looking ship with two pole masts. Her principal dimensions are: Length over all, 530 ft.; length between perpendiculars, 512 ft.; breadth molded, 58 ft.; depth molded, 38 ft. 2 in.; gross tonnage, 9,000; I.H.P., 9,000; boiler pressure, 215 lbs. The propelling machinery consists of two sets of quadruple-expansion engines, each set having four cylinders working on four cranks, balanced on the Yarrow-Schlick-Tweedy system. The high pressure and first intermediate-pressure cylinders are each fitted with a piston valve, and the second intermediate and low-pressure cylinders have flat slide valves, worked by the ordinary double-eccentric and link motion valve gear. Each reversing gear is controlled by a combined steam and hydraulic reversing engine. The crank shafts are in two sections, each section being built, and they, together with the thrust, tunnel, and propeller shafts, are of forged mild steel. The propellers have each four blades of maganese bronze, the boss being of steel. The condensing water is circulated through the condensers by two large centrifugal pumps, one for each condenser, and each worked by an independent engine. Each pump is capable of supplying the circulating water required by both main engines in the event of one pump being disabled. Both circulating pumps are connected to large valves leading to the bilges. The engine room includes two evaporators for making fresh water to supply the boilers, a large feed filter, and a suitable feed heater, etc., etc. A complete installation of donkey pumps necessary for the special nature of the service is fitted. The boilers are six in number—two double-ended and four single-ended of the ordinary multitubular marine type, arranged with Howden's forced draft. Each of the double-ended boilers has eight furnaces, and each of the single-ended four furnaces, a total of thirty-two furnaces, the products of combustion in which are led into one funnel. The boilers are entirely of steel, and adapted for a working pressure of 215 lbs. per square inch. An auxiliary boiler supplies steam to the donkey pumps, fresh water condensers, galleys, etc.

The Orontes is qualified for employment as an armed cruiser, and her name will be placed on the admiralty list for this purpose. She will be employed in the regular passenger and cargo trade between London and Australia. It is interesting to recall that the compound engine was first introduced by the late John Elder, founder of the Fairfield establishment, and that about 1854 or 1855 engines were built by John Elder & Co. which were the initiation of some of the most important developments in marine engineering. For many years the Clyde has been the birth place of ships of the first class, and no company has kept up with the times better than the Fairfield company. The company is now building for the British government the largest battleship ever floated, the Commonwealth, following upon the Good Hope, which lately passed through her trials without an hour's delay.

The British India Steam Navigation Co. (a concern of Scottish origin and Glasgow birth) owns 125 steamers of an aggregate of about 400,000 tons. An addition to this great fleet has just been launched from the Leven ship yard of William Denny & Bros., Dumbarton—a steel twin-screw steamer, 445 ft. by 53 ft. 6 in. by 33 ft. This is the eighty-seventh vessel built by Messrs. Denny for the British India Co., but she differs from her predecessors in being fitted with twin screws, and also in being much larger. Accommodation is provided for thirty-eight first-class passengers in staterooms in the poop. These rooms are especially large and well ventilated for trade in the tropics. Good accommodation is provided for second-class passengers in the bridge house amidships. Both bridge and poop decks are completely covered with boat decks, which not only give large clear promenade areas, but also will provide a shade from the heat of the tropical sun. The first-class saloon is a handsome apartment, decorated in white enamel and gold, all the woodwork being of teak. The saloon is lighted by means of large side lights and by skylights, and all the framing is jalousied, so that a cool, even temperature may be maintained. A refrigerating chamber, kept cool by a large dry-air machine, is provided for keeping a large supply of provisions in good condition. The cargo gear consists of ten hydraulic cranes, two fitted to each hatchway, to ensure rapid and simultaneous discharge from all the holds, of which there are five, one being fitted as a deep tank for carrying water ballast, in addition to that carried in the double bottom and peaks. The powerful steam steering gear is by Alley & McLellan; a right and left screw hand gear by Hastie, fitted with a patent hydraulic brake; a warping winch aft, and a Clarke Chapman windlass and capstan forward. Bollards, fairleads and mooring gear generally are of cast steel, and especially strong to enable the vessel to be securely moored in the Hooghly. All parts of the vessel not otherwise occupied are arranged for the carriage of native passengers, under the regulations of the Indian government.

It is stated that a change has been decided upon in the design of the armored cruisers recently ordered from builders on the Clyde and Tyne, and the preliminary work of preparing for construction has thus been delayed. Originally the vessels were to be 450 ft. long. The length is to be increased by 5 ft., and the beam of 67 ft. will be widened proportionately. This is to admit of additional displacement without materially deepening the draught, and the extra weight is to be absorbed by armor. The County type have 4-in. armor along the water line, and while this was a great improvement, thicker armor is now deemed desirable. The specially hard face requires support from a steel of extra toughness. In the case of the Krupp plates the carburized and chilled surface possesses a very high degree of hardness, and special treatment gives the back of the plate great toughness so as to support the front. Effective resistance necessitates carburization into about 3 in. of the thickness, so with a 4-in. plate the back support might be inadequate. Less depth of super-carbon renders the plate liable to penetration, and the new forged steel cap for forged steel shot threatens to demolish plates of moderate thickness. The most successful shell is made in this country. In the case of the Belleisle trials these shells went through 4-in. hardened plates. The armor of the vessels of the Devonshire class, one each of which is to be built at Clydebank, at Beardmore's, at the London & Glasgow company's works at Govan, at Scott's of Greenock, and at Elswick on the Tyne, is therefore to be increased. The contracts for the armor for the three new battleships will be placed during the next week or so. About 9,000 tons will be required and it is probable that the orders will be divided among the Vickers-Beardmore combine of Glasgow, and Barrow, John Brown & Co. of Clydebank and Sheffield, Charles Cammell & Co. of Sheffield and the Armstrong-Whitworth company.

AMERICAN BRIDGE CO.'S NEW PLANT AT ECONOMY.

The first definite information from an authoritative source in regard to the American Bridge Co.'s monster new plant in the Pittsburgh district was given out in New York this week. The several structural steel plants now located at Pittsburgh, five in number, are to be concentrated into one big plant at Economy. The Pittsburgh plants are to be dismantled as soon as possible and the land they occupy sold for what it will bring. The new plant at Economy will have a capacity of between 13,000 and 15,000 tons a month, and will be the largest concern of its kind in the world. The next largest plant belonging to the American Bridge Co. has a capacity of between 7,000 and 8,000 tons a month. Construction plans have been drawn and approved and all of the preliminaries have been completed, but the American Bridge Co. has not yet been notified by the United States Steel Corporation to proceed. This is a matter of mere formality, however, and it is expected that active work will begin very soon. The American Bridge Co. already has a plant at Economy. It is practically new and will be permitted to remain as it is. The benefits expected to be derived from the merger of five Pittsburgh properties into one big plant at Economy are manifold, but arise mainly from the decreased cost of production. Another consideration is that the new property will be equipped with facilities for producing shapes which are now manufactured nowhere in the world. The evolution of skyscraper buildings and bridges has created a demand for shapes of greater size, weight, etc., than any existing plant is now prepared to produce. The American Bridge Co.'s new plant will be provided with exclusive machinery for the production of these shapes.

Incidentally it is interesting to know that if the American Bridge Co. should take not another order this year it would be able to continue operations at maximum capacity well along into 1903. It is turning down new business every day, taking only the cream of the contracts offered, and at very good prices. The company is supplying practically all of the structural steel for fifty big office structures now building in New York, and in a number of instances the construction work also is being done by the American Bridge Co. Although the company's capacity has been increased nearly 20 per cent within a year, it is just now seeing its way out of the business that was brought over from 1901.

VALUE OF SUBMARINE BOATS.

Ensign Charles Nelson of the United States navy, torpedo expert in charge of the United States torpedo station at Port Royal, gave some interesting information on the relative value of surface and submarine boats to the house committee on naval affairs this week. He said he believed the French submarine boats were too long, as in coming up they exposed the nose to a considerable length and rendered their most vulnerable part liable to destruction by a chance shot. The Holland boat he considered very easy to work in heavy seas. If during a storm it was desirable to economize in the motive power, the Holland boat could go down 30 or 40 fathoms, which is the deepest water in which it would be likely to be used, and lie on the bottom until the storm passed.

The moral effect of a submarine boat, he said, was of even greater value than its destructive ability. The appearance of a Holland boat at sundown in a harbor where an enemy's fleet was lying would cause the fleet to put to sea immediately rather than take a chance of losing one or more vessels by submarine night attack, from which it would be almost powerless to defend itself. He referred to the great excitement along the Atlantic coast during the Spanish war from fear of a possible attack on our coast cities, and said that the fear would not have been so prevalent had the harbors been protected by submarine boats. Battleships were all right, he said, but their business was to fight at sea, and he considered it a useless extravagance to keep a $7,500,000 battleship cooped up in a harbor where a half dozen submarine torpedo boats would answer the same purpose.

Representative Lessler—"As an officer of the navy, do you feel that we should expend the money of the United States to develop a boat to be built by private enterprise?"

Ensign Nelson replied that he did, as it would enable the United States to get a better boat. Questioned very closely by the members of the committee as to the liability of submarine boats to accidents and as to the comparative danger of serving on submarine boats and battleships, he maintained that there was no more danger on one fighting machine than on another, and said that as an officer he would prefer to serve on a submarine boat.

The schooner yacht Hoosier was launched from Thomas A. Irving's ship yard, Gloucester, Mass., last week. The Hoosier was built for Col. William Nelson, publisher of the Kansas City Star. She was modeled after the famous fishing vessel, Richard Wainwright. Her dimensions are 123 ft. over all, 100 ft. on the water line and 25 ft. 2 in. beam. Below she is very roomy, having a large saloon and twelve staterooms. All the finish is in white mahogany.

It is officially announced that in connection with the mammoth bridge works to be erected at Economy, Pa., by the United States Steel Corporation, there will be constructed extensive yards for the building of steel barges. The steel barge enterprise and the bridge works will necessitate an outlay of between $3,500,000 and $4,000,000.

THE SHIPPING AGREEMENT.

FULL TEXT OF THE DOCUMENT AS DRAWN BY MR. J. PIERPONT MORGAN AND THE OWNERS OF THE WHITE STAR AND DOMINION LINES.

Below is given in fairly complete form the full text of the agreements with and terms of purchase of the various steamship lines in the Morgan shipping combination. The agreement was made on Feb. 4 last. The following is the phraseology of the provisional agreement:

Ismay, Imrie & Co., of No. 30 James street, in the city of Liverpool (hereinafter called the White Star vendors); Richards, Mills & Co., of No. 24 James street, in the city of Liverpool (hereinafter called the Dominion vendors); Peter A. B. Widener and Clement A. Griscom (hereinafter called the American vendors), and Bernard N. Baker (hereinafter called the Atlantic vendor), parties of the first part (hereinafter called the vendors), and J. P. Morgan & Co. (hereinafter called the bankers), parties of the second part:

The object and purpose of this agreement are the acquisition on or before Dec. 31, 1902, of the maritime properties and businesses hereinafter described, by a corporation (hereinafter called the corporation), to be organized under the direction of the vendors to the satisfaction of the bankers, under the laws of the state of New York, or such other state as shall be selected by them, for and in consideration of the issue therefor to the vendors or their representative of the total capital stock of the corporation, being $120,000,000, of which $60,000,000 shall be preferred stock, entitled and limited to cumulative dividends (in the same manner as the preferred stock of the United States Steel Corporation), at the rate of 6 per cent per annum, payable semi-annually, and $60,000,000 common stock, limited to dividends of 10 per cent per annum, so long as there shall be outstanding any of the debentures, hereinafter mentioned, and also $50,000,000 of collateral trust debentures, bearing interest at the rate of 4½ per cent per annum, payable semi-annually, the principal to be payable in twenty years, with the right to the corporation at any time after five years to redeem the same at 105. The maritime properties and businesses to be acquired by the corporation are the following:

Seven hundred and fifty shares of one thousand pounds (£1,000) each, all fully paid up, of the Oceanic Steam Navigation Co., Ltd., of No. 30 James street, in the city of Liverpool (hereinafter called the White Star line), including the new vessels building for said company, and including all rights in the name of the White Star line and in the flag of such line.

The business, good will, assets and property of the firm or partnership of Ismay, Imrie & Co., as carried on by them in the cities of Liverpool, London or elsewhere, including, so far as the White Star vendors can sell and dispose thereof, the position of managers of the Oceanic Steam Navigation Co., Ltd.; but excluding therefrom all of the properties and rights mentioned in the special contracts or agreements collateral hereto between the White Star vendors and the bankers, to which contracts reference is made for a statement of the terms, conditions, consideration and extent of the transaction agreed upon in respect of such shares, business, good will, assets and property.

All the shares of the British & North Atlantic Steam Navigation Co., Ltd. (hereinafter called the Dominion line), including all shares of the Mississippi & Dominion Steamship Co., Ltd., including all the new vessels building for said companies, and including all rights in the name of Dominion line and in the flag of such line.

The business, assets and good will of the partnership or firm of Richards, Mills & Co., as managers' agents, forwarding agents, master porters or otherwise, in connection with the business of the British & North Atlantic Steam Navigation Co., Ltd., and the Mississippi & Dominion Steamship Co., Ltd., as carried on by them, whether in Great Britain or abroad; but excluding therefrom all of the properties and rights mentioned in the special contracts or agreements collateral hereto between the Dominion vendors and the bankers, to which contracts reference is made for a statement of the terms, conditions, consideration and extent of the transaction agreed upon in respect of such shares, business, assets and good will.

The capital stock, properties and assets of the International Navigation Co. (hereinafter called the American line), including the new vessels building for said company.

The capital stock, properties and assets of the Atlantic Transport Co., of West Virginia (hereinafter called the Atlantic Transport line), including the new vessels building for said company.

One hundred and eighteen thousand, four hundred and sixty-three ordinary shares and 58,703 preference shares of the capital stock of Frederick Leyland & Co., 1900, Ltd. (hereinafter called the Leyland line).

The date as of which such acquisition of the White Star line and business, and of the Dominion line and business is to be made in Jan. 1, 1901, so that the corporation shall be entitled to all of the profits of the operations of the said lines and business acquired as aforesaid from and after Jan. 1, 1901, and shall be bound to pay upon the several purchase prices interest at the rate of 5 per cent per annum from Jan. 1, 1901, until the date from which cumulative dividends shall begin to accrue upon the preferred stock of the corporation.

The relative valuations of the several properties for the purposes hereof are to be as follows: The valuation of the shares of the White Star line shall be a sum equal to ten times the net profits of the company for the year 1900, such profits to be taken as shown by the company's books, subject to the deductions and exceptions, and with the further conditions shown and stated in the collateral agreement, with respect to the method of the ascertainment of the price and property of the White Star line involved hereunder, it being expressly understood that all calculations necessary to arrive at the exact sum to be paid or to be accounted for by the White Star vendors or by the corporation, respectively, under any of the provisions of this agreement, are, if the parties shall be unable to agree thereon, to be made by Messrs. Price, Waterhouse & Co., of the city of London, chartered accountants, and each party shall accept their calculations and decision thereon as final and binding, and act accordingly, and pay one-half of their charges.

The same basis is also used as a valuation for the business of the firm of Ismay, Imrie & Co. in any way connected with shipping; and also for the Dominion line and the shipping business of Richards, Mills & Co., who are the owners of the Dominion line. Then comes the following provisions in the agreement:

The aggregate valuation of the American line and of the Atlantic Transport line, including new tonnage, and as to the American line, subject to $19,686,000 of the 5 per cent bonds of that line, shall be $34,158,000.

The valuation of the shares of the Leyland line shall be $11,736,000, it being understood that there are or will be outstanding £815,000 5 per cent preference shares, and £500,000 4 per cent debentures of the said line, not included hereunder.

The price and the method of payment of the price for the said several properties referred to above as collateral agreements, to be conveyed to the corporation shall be as follows:

For the total valuation of the White Star line, and the business of Ismay, Imrie & Co. determined, as aforesaid (exclusive of new tonnage and except as otherwise provided in said collateral agreements), 25 per cent thereof in cash, 75 per cent thereof in preferred stock at par, and a sum equal to 37½ per cent thereof in common stock at par of the corporation.

For the total valuation of the Dominion line and the business of Richards, Mills & Co. determined as aforesaid (exclusive of new tonnage and except as otherwise provided in said collateral agreements), 25 per cent thereof in cash, 75 per cent thereof in preferred stock at par, and a sum equal to 37½ per cent thereof in common stock at par of the corporation.

For the total valuation of the American line and the Atlantic Transport line (exclusive of new tonnage and also exclusive of proper interest adjustment), $18,314,000 in the preferred stock at par and $9,157,000 in the common stock at par of the corporation, and, also, as and when required, $15,844,000 in cash for new tonnage and indebtedness, and such further cash as may be required for proper adjustment of interest at a rate not exceeding 6 per cent per annum.

For the said ordinary shares and preference shares of the Leyland line, $11,736,000 in cash, with a proper addition thereto for interest at a rate not exceeding 6 per cent per annum.

All the remainder and residue of the preferred stock and the common stock of the corporation, and also its said collateral trust bonds for $50,000,000, are to be retained by and are to belong to the vendors, who, however, are to contribute to the corporation, as working capital, $786,000 in preferred stock and $6,643,000 in common stock, and are to transfer to the syndicate (if and when formed by the bankers) for $50,000,000 cash, and in full payment for its services, the said $50,000,000 debentures and $2,500,000 of preferred stock and $25,000,000 common stock of the corporation.

It is understood that if so determined by the bankers (who are hereby vested with power to make such determination in the exercise of their unrestricted discretion), the corporation either may take or may decline to take any one or more of the said lines (except as otherwise provided in the collateral agreement), of which less than three-fourths interest shall be delivered to the corporation at the time that it shall complete its purchase as aforesaid on or before Dec. 31, 1902. Notwithstanding the exclusion of any one or more of said lines or businesses (if so determined by the bankers), the corporation may take any or all of the other lines or businesses hereinabove described. In the event any of said lines or businesses shall be so excluded from the transfer herein proposed, then and in every such case the indebtedness and capitalization of the corporation shall be reduced correspondingly.

The bankers were to form a syndicate to purchase from the vendors for $50,000,000 in cash the debentures mentioned above, the $25,000,000 in common stock and $2,500,000 in preferred stock; but in case the syndicate was not formed by April 30, 1902, the obligations in the provisional agreements ceased.

The accompanying letter, signed by J. P. Morgan & Co., and dated New York, Feb. 5, 1902, was addressed to Messrs. Ismay, Imrie & Co., Richards, Mills & Co., P. A. B. Widener, Clement A. Griscom and Bernard A. Baker:

"Gentlemen: Referring to the agreement entered into by the undersigned with your good selves, under date of Feb. 4, 1902, we beg to confirm the statement already made to you orally that, in our judgment, it may be an essential condition to the completion of said contract that the majority of the shares of the new corporation should at the outset be held in America. As the contract and capitalization are now arranged, this might not be the case. As we have stated to you, under such conditions, we do not think it would be practicable to bring out the company successfully in America. We think it likely, however, that arrangements can be made, outside of the contract, which will avoid this difficulty, and having made this explanation we are quite willing to execute the agreement, our only desire being that you should be in full possession of our views on the subject, so that in case it should prove impossible to avoid the difficulty which we now hope to overcome, you might not be disappointed if we should be compelled to advise you that we are unable to successfully carry out the contract."

Each of the sellers entered into the following agreement: "The sellers, and each of them, hereby agrees that they will not, nor will any of them, except with the consent of the purchasers or its successors or assigns, as the case may be, for a period of fourteen years from the date hereof, directly or indirectly be interested, whether as principal, agent, manager, or otherwise, in the steam or shipping trade between the seaboard of the United States, of Canada, of the West Indian islands, and of the Gulf of Mexico and ports in the United Kingdom, or on the continent of Europe, or in any steam or shipping trade in which the steamers of the Oceanic Steam Navigation Co., Ltd., have hitherto traded, or to or from ports adjacent thereto. This restriction is not to prevent the sellers, or any of them, from being shareholders merely in any company owning vessels trading in the prohibited areas. Nothing herein contained shall prevent the sellers, or any of them, from continuing to act as a director or manager of the company, or any other company which the purchasers form for carrying on shipping business."

The following agreement is made with Harland & Wolff, the Belfast firm of ship builders. It is probably, to American ship builders, the most interesting provision in the whole agreement:

"Whereas, the purchasers desire, in case said principal contract is carried out, to arrange with the builders for the construction and repair of ships for the purchasers, now, this agreement witnesseth:

"In consideration of the undertakings given by the builders in clauses 2 and 3 of this agreement, the purchasers bind and oblige themselves to place or cause to be placed with the builders, on commission, terms as set forth in clause 4 of this agreement, all orders for new steamers or

heavy repairs or alterations that require to be done at a ship yard in the United Kingdom of Great Britain and Ireland, including rebolting, re-engining, and such like. Nothing herein contained, however, shall prevent the purchasers from placing orders for new steamers or heavy repairs or alterations, reboilering or re-engining at ship yards in the United States. The builders shall and do undertake to carry out all such orders to the full capacity of their ship yards and workshops, except as regards the Hamburg-Americanische Packetfahrt Actien Gesellschaft's contract provided for in the following clause:

"The builders shall and do undertake not to build for any other ship owners than the parties hereto, provided orders from the purchasers suffice to keep the said builders' works fully and continuously employed, and in any case the builders are not to accept orders from parties who are competitors of the purchasers in any trade at the time carried on by them without first obtaining the purchasers' consent; but this proviso is not to prevent the builders accepting orders from the Hamburg-Americanische Packetfahrt Actien Gesellschaft.

"The commission terms on which the work shall be carried out are to be as follows: The cost to the purchasers to be—

"The cost as shown by the builders' books, including wages, materials, direct expenses, and a due proportion of fixed expenses and establishment charges.

"A commission on the whole as the builders' profit, said commission in the case of new ships and their machinery to be reckoned at 5 per cent, on new boilers and on engines for other than new ships, 10 per cent, and on repairs, renewals, alterations and shipwork in connection with reboilering and re-engining, 15 per cent.

"Payment is to be made by the purchasers as required by the builders on the basis of cash against expenditure during the progress of the work, and the ascertained balance on completion, and interest at 5 per cent per annum to be allowed on expenditure in advance of payment or payments in advance of expenditure, as the case may be, but no large balances to stand over except by mutual arrangement.

"Nothing in this agreement shall prevent the purchasers from building, repairing or altering, reboilering or re-engining in other ship yards should the builders be unable to undertake it within reasonable time. This arrangement to be for ten years from the date hereof and terminable at the expiration thereof or after by five years' notice by either party."

So it would seem that Mr. Pirrie of the firm of Harland & Wolff, who negotiated the sale of the White Star line to the combination, has secured for himself a very valuable contract.

PEN SKETCH OF THE RT. HON. W. J. PIRRIE.

Mr. Curtis Brown of London contributes to the American newspapers the following sketch of Mr. W. J. Pirrie of the ship building firm of Harland & Wolff, Belfast, Ireland:

The Rt. Hon. W. J. Pirrie was a millionaire before he put the White Star line into the Morgan group, and unless all reports as to the value received are erroneous, his wealth was enormously increased by the deal. Before Morgan got the Leyland line, Pirrie was the biggest man on the Atlantic, so to speak, and even now, after surrendering control of the White Star line, he remains probably the greatest shipping power in England and the greatest ship builder in the world. The fact that this British partner in the Morgan deal was born poor is offset by the fact that he was born in America. His father died in Quebec when the boy was a year old, and his mother took him back to Ireland, whence the family had come. One day, at the age of fifteen, he turned up at the offices of Harland & Wolff, then a comparatively small ship building firm in Belfast, and went to work as a draughtsman for next to nothing a week. That was a great day for him, and a great day for Harland & Wolff, although it seems to have been some time before the firm realized that they had taken on a remarkable sort of a boy.

Those who know the Pirrie of today say that he is wonderfully like Pierpont Morgan in all of the things that count for the making of the sort of a man you can't hold down, but he had to travel upward step by step without much general education, without friends who could help him and without finding much promise in the future for reaching as good a place as Morgan had to start with in his father's banking house after a finishing educational polish at Heidelberg. Pirrie's only advantages over the other young fellows in the Belfast ship yard were an uncommonly hard head, a knack of seeing what was wanted before anyone else did and grit enough to do it without figuring too closely how much there was in it for him. In twelve years he had climbed up through all the subordinate positions to that of manager, and at the age of twenty-seven was taken into the firm. Presently both Harland and Wolff roamed away to the house of commons and left the youngest partner to run the business pretty much as he pleased. It had grown to be an important firm before Pirrie came into it, but it spread out over the banks of the river Lagan afterward in marvelous fashion, and finally captured and kept the world's record for annual output. It launched nearly 100,000 tons last year, almost a quarter as much as the total tonnage of American steamers engaged in foreign trade. It has 10,000 people on the pay-roll and the works sprawl out over 100 acres. These works have a good deal of American interest just now, because whether or not the British nation at large lost its grip on the Atlantic through the steamship combine, it is now an open secret that Pirrie gained a lot for his ship yards and that a goodly proportion, at least, of the huge racers the combine is going to build will come from these Harland & Wolff yards.

Although the Belfast ship builder is generally supposed to be the second biggest man in the new combination, and although he has just brought off the most successful stroke he ever made, it does not appear that in general he owes much to the kind of luck that tumbled Alfred Beit into the Kimberley diamond fields at just the right moment for founding the greatest fortune in Europe. He admits though that he did have one glorious bit of luck when he married Mrs. Pirrie. That brought a turning point in his career—or maybe it would be more accurate to say that it kept his career from having a turning point. He had been possessed of a notion that British politics offered the best goal for him. Mrs. Pirrie knew better and argued him out of the idea. He now says gallantly that he owes whatever success he has had to his wife. She seems to have given him a little political leeway, however, for he put into political affairs in Belfast the same indomitable energy that he put into ship building. He became a sort of father of the city, to whose importance his firm had been the chief contributor. He was made lord mayor, and got to the pinnacle of British social ambition by entertaining royalty on several occasions. Mrs. Pirrie left her impress on the city likewise by raising $500,000 to found the Royal Victoria hospital and by getting a big endowment for it. His services were recognized by the government, too, and he was made a member of the privy council—which makes a man right honorable, but does not do much else for him.

Mr. Pirrie became one of the largest stockholders in the White Star line through having built all their ships. The Oceanic, in particular, was his personal pride and joy. The Celtic, the biggest ship afloat, was also specially designed by him. It is a queer fact that his firm built something like $40,000,000 worth of White Star ships without ever having a contract. Today the greatest Atlantic line and the greatest ship yard are so closely allied that you can hardly tell which from t'other. They say over here that it was Pirrie quite as much as Morgan who cooked up the White Star deal, and my informant implies, although he refuses to go into particulars, that the public would be somewhat astonished if it knew how brief and informal were the negotiations between the two financiers. British papers have been howling for weeks about the disaster which, they say, has overtaken British shipping, but the Pirrie view of the deal is that it is a little private dicker that he and Mr. Morgan happened to make one day, and that isn't going to hurt the nation a particle. He does not even think that the combination will result in an increase of passenger fares.

The predominant British partner in the combine—or conspiracy, as they have a tendency to call it in the house of commons—celebrates his fifty-fifth birthday at the end of this month, and is therefore just ten years younger than Morgan. Like his American co-laborer, he is not a "pretty" man, is not much given to wasting time or words, and gets more fun out of business than out of anything else in life. He has a taste for the unostentatious sort of charity, and makes a tour of the poorest quarters in Belfast every Christmas in the role of Santa Claus. He is more punctual and methodical than the average clock, and until lately used to put in eight hours' hard work every day at his office. One or two visits which he had paid to the United States convinced him that the American system of keeping in close personal touch with the workman was preferable to being an inaccessible and remote sort of divinity. A member of parliament who knows him well tells me that on returning from one of these visits across the Atlantic Mr. Pirrie called his employes together, and said that if any of them should ever have a grievance he wanted to have it brought before him personally. He promised that no man should be discharged without having a chance to appeal.

One reason for the rise of the Harland & Wolff yards and for the success of the White Star ships was that the managing partner knew every last detail of the work himself. Just before joining the firm he made tours all over the world, studying minutely the needs of traffic. Then he went back and turned out the Britannic and Germanic, which were as great a marvel in their day as the Deutschland, Kaiser Wilhelm der Grosse and Oceanic are now. They beat everything afloat and got better as they grew older. Although she is thirty years old now, and has outlived nearly all her contemporaries, the Germanic actually beat all her records not long ago, and is still traveling from New York to Liverpool in better time than half the passenger steamers that cross the ocean. Mr. Pirrie doesn't share the views occasionally expressed over here that ocean speed has reached its highest economical point, but, with characteristic caution, he cannot be persuaded to venture into prophecy concerning the number of days it will take to get across the ocean a generation hence or how much it will cost. He thinks there is not a business in the world that is going to offer a better chance for young men than that of ship building, especially in the engineering branch.

OPPOSED TO SUBMARINES.

In a hearing before the house naval committee this week Rear-Admiral George W. Melville, engineer-in-chief of the navy, strongly opposed the construction of submarine boats. He said the development of submarine boats is in its infancy and that the Holland is only a scientific toy, basing his opinion, he said, on a close theoretical study he had given to the subject. He related his experience with Mr. Holland, the inventor of the boat, and with the first one planned, the Plunger.

"I had no idea then that the boat ever would be a success," he said. "but congress had appropriated $150,000 for the experiment and there was nothing left for the navy department to do but to spend the money." The admiral said he had expressed his views very forcibly on this subject a year and a half ago to the committee and had no reason to change his opinion given at that time, that submarine boats are not successful nor a necessary equipment of the navy.

Rear-Admiral F. T. Bowles, chief naval constructor, explained to the committee that he had given the subject of submarine boats careful consideration, although they never had come before him for personal investigation. He has had very little experience with them, but is familiar with their principles. He said he thought the boats are markedly deficient in speed and, according to reports, inferior to foreign boats.

Capt. Charles D. Sigsbee, chief intelligence officer of the navy department and a member of the board of construction, did not agree in his testimony with Admiral Melville as to the moral value of a submarine boat. "Its moral influence is something tremendous," he said, "especially when you consider that such a boat can make an attack at any time and the enemy is powerless to prevent it." Capt. Sigsbee said that of course he spoke on the hypothesis that the boat would be perfectly equipped.

The new Atlantic Transport line steamship Minnetonka arrived in New York this week from the builders' yard at Belfast. Her dimensions are: Length, 600 ft.; beam, 65 ft.; and depth, 44 ft; registered tonnage 8,616 and gross 13,398. She is fitted to carry cabin passengers only. She has twin screws, driven by separate sets of quadruple-expansion engines. She has a large cargo and dead meat capacity, and will carry a great many head of cattle and horses. The Minnetonka, which was built by Harland & Wolff, will take her place in the London and New York service, sailing on May 31. She is commanded by Capt. Sydney Layland.

The Racine Boat Manufacturing Co., Racine, Wis., is negotiating for the purchase of a new factory site on Jacob's island, near Kenosha.

STEAM YACHT OSWEGATCHIE.

The Oswegatchie, a steam yacht that will certainly attract a great deal of attention in the great lakes region, was launched recently from the yard of the Marine Iron Works, Chicago. She is as handsome and well built a boat of her kind as was ever turned out from any yard, and is a fine example of the high standard of work for which the Marine Iron Works are noted, and which their splendidly equipped plant enables them to turn out.

The Oswegatchie was built for Mrs. Carrie A. C. Vilas of Alexandria Bay, N. Y., to be used in cruising amongst the Thousand Islands of the St. Lawrence, with an occasional trip around the great lakes, or off the coast of Maine. In view of her possible use in salt water, she was equipped with inboard surface condensing engines and particular attention was paid to making the hull so stanch as to be safe even in very heavy weather.

The principal dimensions of the boat are: Length over all on deck, 80 ft.; length on load water line, 64 ft.; overhang forward (cutter bow), 8 ft.; overhang aft, 8 ft.; beam amidships on load water line, 13 ft.; extreme beam amidships, 13 ft. 6 in.; draught ready for trial trip, 4 ft.; displacement on 4 ft. draught, 1,550 cu. ft.

The overhang both forward and aft is very gracefully lined, the entrance is straight and clean cut and the sweep of the water lines into the counter promises well for speed. The body of the boat shows full strong lines with very little dead rise, evidently designed to accommodate an exceptionally complete equipment of powerful machinery, to furnish comfortable cabin arrangements below deck and still further assist that stability that is so essential to real pleasure. The distribution of weights is shown in a table at the end of this article.

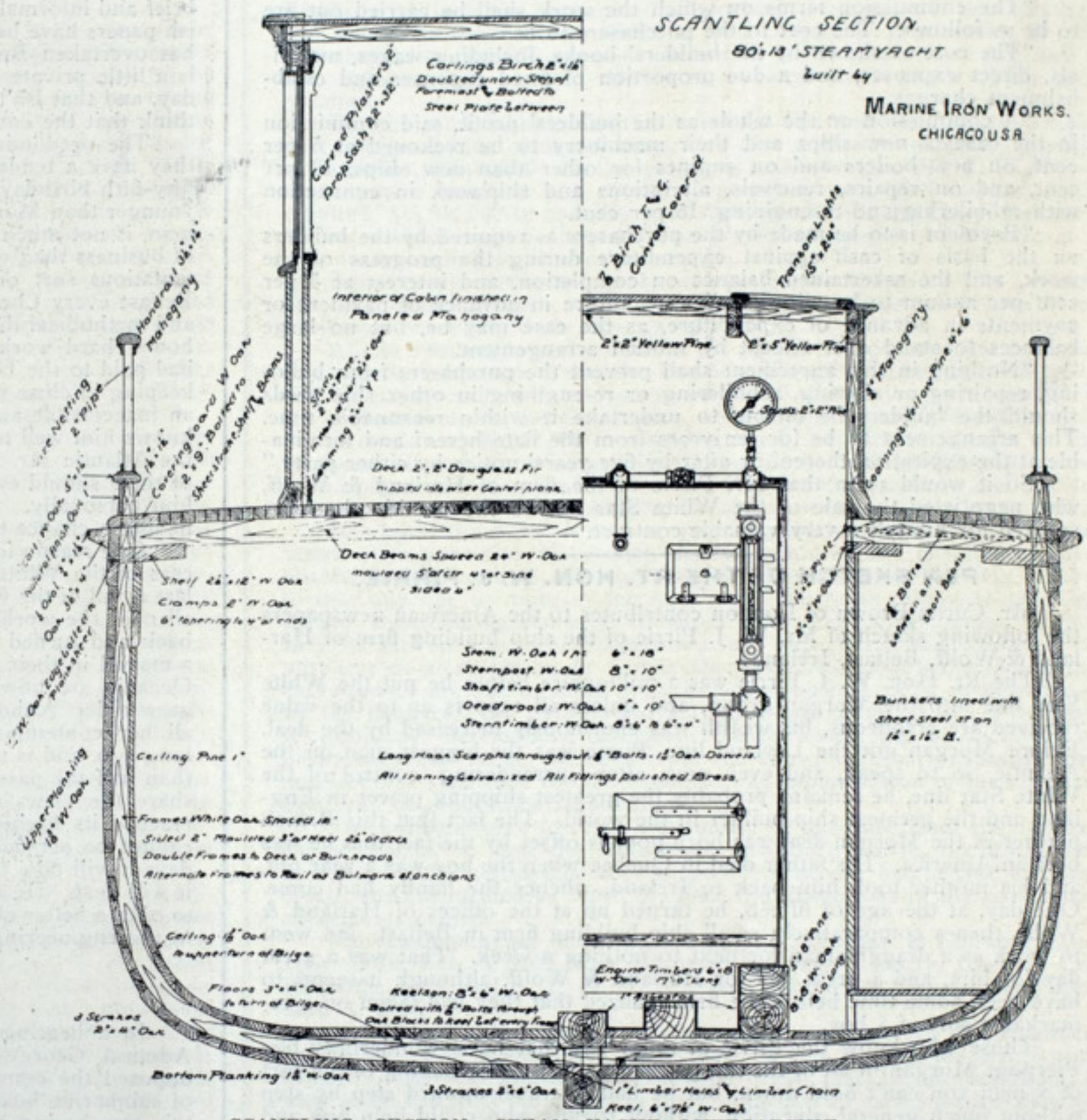
The accompanying illustrations show the general arrangement of the boat. Below deck, aft of the engine and boiler room, are the quarters for the crew, while the space forward below the deck house is divided into private staterooms for the owner's family with bath adjoining, and berth accommodation besides, for four in the forward cabin. The after part of the deck house is conveniently arranged as a galley, the main portion being handsomely finished as a dining saloon. Paneled mahogany and plate glass play the principal part in the finishing, and while comparatively severe in style, the effect is very taking.

The splendid construction of this boat, both as to design and workmanship, entitles the Marine Iron Works to a great deal of credit. The scantling section shown herewith gives the main features of construction, but the Oswegatchie herself must be seen to fully appreciate the design and workmanship. The heavy shelf pieces of 2½x12-in. selected white oak run all fore-and-aft and are strongly scarphed and bolted into plates at bow and stern, as well as to each frame and beam, and to sheer strake and covering board. Oak blocks are closely fitted from frame to frame between keel and keelson and ⅝-in. galvanized bolts hold all three firmly clamped together. The stem is cut from a single piece of carefully selected white oak, and like the stern post and deadwood, besides being well scarphed and bolted to the keel with ⅝-in. bolts and 1¾-in. oak dowels, has steel plates dove-tailed into each side, to make the scarph absolutely rigid. As shown in the scantling section, the deck is well reenforced at the openings for boiler and engine room transom, and both frames and deck beams are doubled at the bulkheads. The studding of both transom and deckhouse is tenoned into plate and coaming, while long ⅝-in. rods between each stud pass through the plate and coaming, bolting the whole securely to the deck beams.

The powering of the boat consists of a fore-and-aft compound high-speed condensing engine, splendidly proportioned, being of a solid-back, open-front, slipper-guide type for which the Marine Iron Works are noted. The high-pressure cylinder is 7½ in. diameter, fitted with balanced piston valve. The low-pressure cylinder is 16 in. diameter, fitted with slide valve. The stroke is 10 in. Completeness of the fittings and their character are in line with the design and workmanship of the engine itself. The propeller shaft is finished to 3¾ in. diameter and carries a 46-in. four-blade speed propeller wheel, made of phosphor bronze. The Roberts government test safety water-tube marine boiler, of which the Marine Iron Works are builders under license from the patentees, is a special size, measuring 5½ ft. athwartship by 7½ ft. fore-and-aft, and 5½ ft. high. It has 25 sq. ft. of grate surface, nearly 800 sq. ft. of heating surface and carries about 1,250 lbs. of water to the second gauge. The hydrostatic pressure test on the boiler is to be 500 lbs. and the steam pressure allowed 250 lbs.

DISTRIBUTION OF WEIGHTS, STEAM YACHT OSWEGATCHIE.

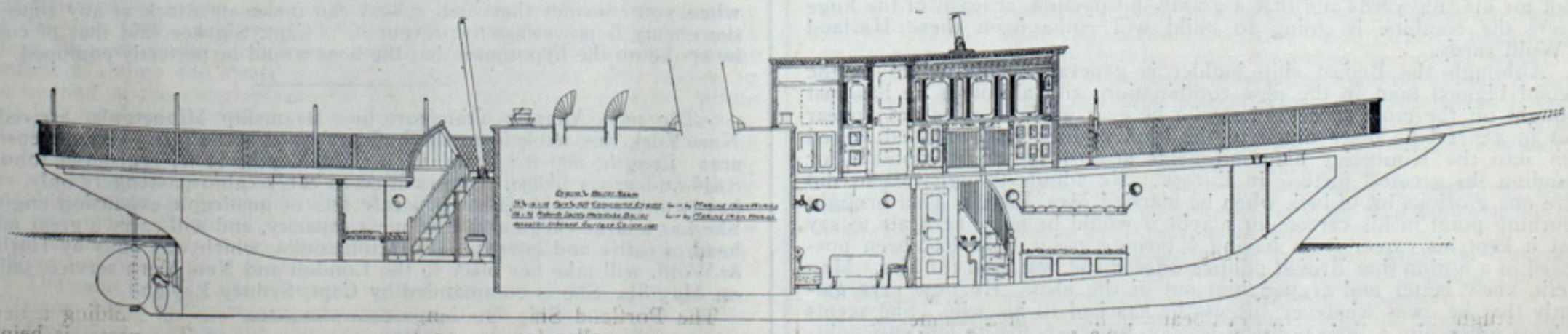
	Pounds.	Per cent.
Hull proper	38,000	39.7
Main engines and boiler	15,500	16.2
Condenser and auxiliaries	4,300	4.5
Propeller, shafting and bearings, with stern tube and boxes	2,900	3.0
Electric plant, hot and cold water tank, ice storage, etc.	2,000	2.1
Cabin and deck equipment	11,200	12.7
Power equipment and spare parts	800	.8
Coal in fuel bunkers	13,340	13.8
Water in boiler and tanks, ice, provisions, stores, etc...	7,000	7.2
Total	95,540	100


SCANTLING SECTION
80'x13' STEAMYACHT
built by
MARINE IRON WORKS.
CHICAGO U.S.A.
Deck Beams Sided 2½" W. Oak
Shelf 2½"x12" W. Oak
Clamps 2" W. Oak
Ceiling Pine 1"
Frames White Oak Spaced 18"
Ceiling 1½" Oak
Floors 3"x11" Oak
Keelson: 8"x6" W. Oak
Bottom Planking 1½" W. Oak
Stem: W. Oak 1 Pc 6"x18"
Sternpost W. Oak 8"x10"
Shaft timber: W. Oak 10"x10"
Deadwood: W. Oak 8"x10"
Sterntimber: W. Oak 8'6" & 6'4"
Long Hook Scarphs throughout
All Ironing Galvanized All Fittings Polished Brass
Bunkers lined with Sheet Steel at on 12"x12" B.
Engine Timbers 6"x10" W. Oak 17'0" Long
3 Strakes 2½"x6" Oak
Keel 6"x7½" W. Oak

SCANTLING SECTION, STEAM YACHT OSWEGATCHIE.

The fittings and auxiliaries are very complete, including Penberthy auto-positive injector, Worthington duplex steam boiler feed pump and Marine Iron Works combination deck, test and hand boiler feed pump (capable of being worked against 700 lbs. pressure). The entire outfit, excepting the special auxiliaries mentioned, is designed and built by the Marine Iron Works. A Wheeler light-weight inboard surface condenser, mounted complete on combined air and circulating pumps, very properly forms a part of the outfit of driving machinery, and it also is right in line with the balance of the high-class work incorporated into this steam yacht.

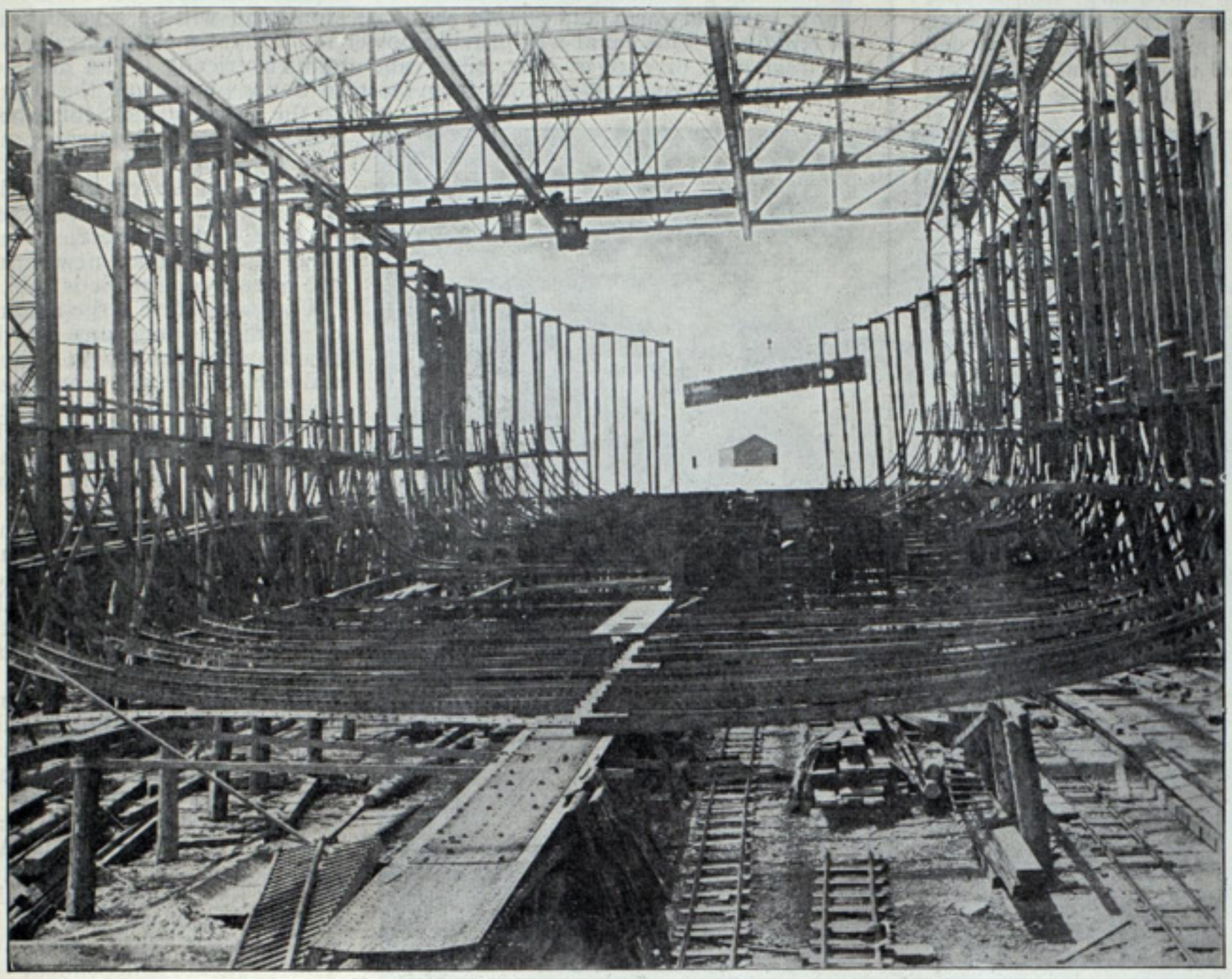
Notices have been sent out calling for the payment of the second instalment of 25 per cent. by the syndicate which underwrites the Morgan shipping combination. The issue of the call was construed in Wall street as evidence that the deal is going through smoothly. The underwriting syndicate agreed to furnish $50,000,000. About 60 per cent. of the subscriptions to the syndicate were from this country and about 40 per cent. from abroad.



STEAM YACHT OSWEGATCHIE—INBOARD SECTION.

ONE DAY'S WORK ON BATTLESHIP RHODE ISLAND.

Since the commencement of the work of building the new ship house at the works of the Fore River Ship & Engine Co., Quincy, Mass., it has daily become more evident that this carefully-designed structure and crane service would possess many advantages as compared with previous practice either in this country or abroad. Rapid work and economy are



ONE DAY'S WORK ON THE BATTLESHIP RHODE ISLAND.

synonymous terms in ship building and the efficiency of a fixed overhead structure, upon which a number of cranes can rapidly be moved the entire length of the ships, has already been amply demonstrated by actual progress on the battleships New Jersey and Rhode Island. The increase in capacity made possible by this design becomes particularly marked when compared with the single cantilever extending over two ships and supported upon a tower traveling between them, for with equipment of the latter type not only is the service practically limited to a single crane for the two ships, but the weight of crane in proportion to the average load to be carried is excessive and the power required to move this excessive crane weight along the track is evidently non-productive. The ship house at Fore River has a span of 185 ft. between columns and is 490 ft. long and within this span are being built the two 15,000-ton battleships, each served by two electric cranes running on girders 100 ft. above the ground. While the service has but recently been placed in commission and has not been operated to its full capacity, yet the following record will indicate what may be expected in the near future when men and equipment shall have settled down to the work before them.

On the morning of May 19 the only indication of the future battleship Rhode Island consisted of the flat keelson plates upon the wooden blocking. The accompanying illustration shows the result of the day's work, the starboard crane working nine and the port crane seven hours, practically eight hours work. The weather conditions were not favorable and early in the afternoon a steady rain set in, the men, however, continuing at work. The record showed seventy-one frames set and bolted on the starboard side, forty-seven frames on the port side, ninety-eight floor plates and one vertical keel plate, a total of 217 separate pieces. The men employed on the job comprised twelve fitters and bolters up and eight ship carpenters and riggers, a total of twenty men. The cranes were operated in advance of each other; that is, while one crane picked up a frame at the end of the ship house and took it to its place in the ship to be set and bolted up by the men, the other crane returned from its trip to the ship and was made fast to its next load. It will be noted that comparatively few men were detailed to the job and at no time was the full capacity of the crane service even approached. The possibilities of such efficient service promises much for successful American competition in the ship building world.

The American Steel & Wire Co. has just issued a little booklet devoted to their Crown rail bonds. It is tastefully bound in brown and is of convenient size. In the introduction to the catalogue the company say: "To those who investigate closely will find that our 'Crown' rail bond combines in the highest degree all of the essential elements of a first-class bond, viz: the very highest grade of material, superior workmanship and correct principles of construction and application. These facts form the basis of our claim that the Crown bond, as made by us, is the very best bond ever made and offered to the trade." The catalogue is filled with illustrations of the various types of Crown bonds.

John H. Dialogue & Son, Camden, N. J., launched the new tug boat John A. Hughes last week. She is of beautiful model for a steamer of her class. She is 100 ft. long, 20½ ft. beam and 12.3 ft. deep. In addition to her regular equipment there is installed a complete outfit of appliances for wrecking and aiding vessels in distress.

VISIT FROM THE BATTLESHIP GAULOIS.

Last week the crew of the battleship Gaulois visited Washington to participate in the unveiling of the replica of the Vendome statue of Comte de Rochambeau, the compatriot of Gen. Washington during the revolutionary war. They presented a fine appearance as they marched past the White house and were evidently selected for size, as they did not vary half an inch in their height. Meanwhile the Gaulois remained off Annapolis.

The Gaulois is one of the last and most powerful ships of the French navy. She has a displacement of 11,275 tons, a speed of 18.1 knots and carries four 12-in., ten 5.5-in. and eight 4-in. rapid-fire, sixteen 3-pounders and eighteen smaller guns, together with four torpedo tubes. She has a complement of 631 men. She has a lofty freeboard and her midship section shows the "tumble-home," a survival of the days of the wooden three-deckers. The protection of the hull of the Gaulois embodies some novel structural features. Immediately at the water line is a continuous belt, which is 6 ft. 6 in. in depth, and tapers from a maximum thickness of 15¾ in. amidships to 3 in. at stem and stern. Above this belt is another which is 3 ft. in depth and 3 in. in thickness. Immediately at the top of the main belt is a 3½-in. armored deck, and at the bottom of the belt, below the water line, is an armored deck which is 1½ in. in thickness. From the top of the 3-in. belt up to the level of the main deck there is no armor protection except around the ammunition hoists leading to the 12-in. guns. The secondary battery, which is located within the superstructure amidship, is protected by 3 in. of armor, while the 12-in. guns are protected within turrets of 15¾-in. armor. The obviously weak point in the armor plan is the unprotected space between the main deck and the armored deck, for it would be possible for an enemy to send high-explosive shells through the sides of the vessel and explode them immediately beneath the guns of the secondary battery.

The 12-in. guns, which weigh 46 tons apiece, are of a modern and powerful type, although they are not equal to the new 40-caliber 12-in. guns now building for the United States navy. They fire a 644-lb. projectile with a muzzle velocity of 2,625 foot-seconds, and a muzzle energy of 30,750 foot-tons, the muzzle penetration being 37.3 in. of iron. The second battery of the Gaulois consists of ten 5.5-in. rapid-fire guns, which are contained, five of them within the central citadel on the main deck, and five of them behind shields which are mounted in broadside in the open on the superstructure deck. They fire a 66-lb. projectile with a velocity of 2,625 foot-seconds, and an energy of 3,100 foot-tons. The comparative lightness of the secondary battery of the Gaulois is somewhat compensated for by a battery of eight 4-in. rapid-fire guns, which is carried on the bridges and superstructure at a height of 35 to 40 ft. above the water line. There are also sixteen 3-pounders, ten 1-pounders and eight machine guns. The Gaulois is driven by engines of 14,500 I.H.P., which gave her on her official trial a speed of 18.1 knots per hour. She can carry a maximum coal supply of 1,100 tons, and she has a complement of officers and men of 631. She has four torpedo-tube discharges, of which two are submerged.

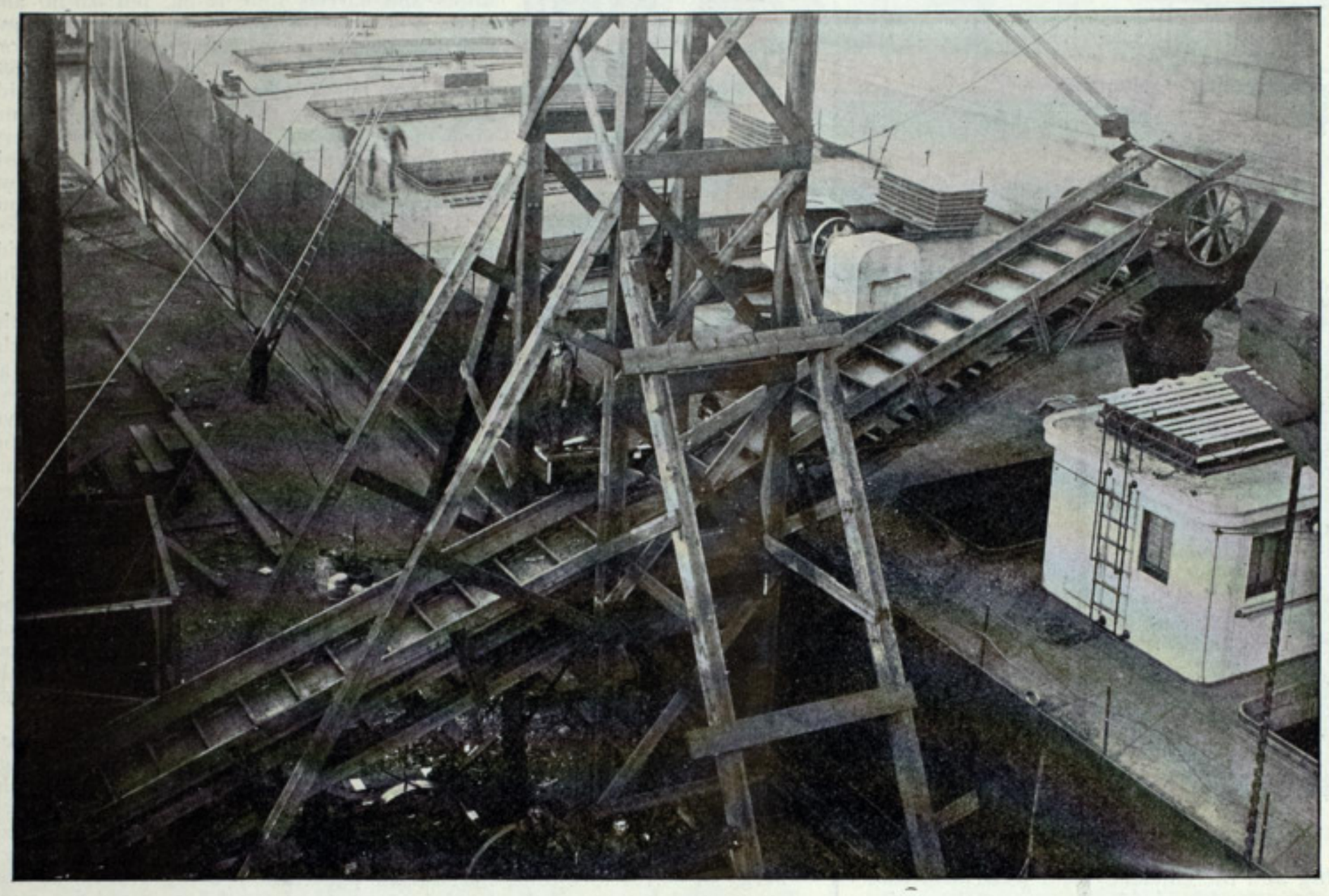
BRITISH SUBMARINES.

During the last few weeks submarine No. 1, one of five submarines now being constructed by Messrs. Vickers, Sons & Maxim for the British admiralty at a cost of £34,000 each, has been submitted to exhaustive trials at Barrow. The vessel was taken off Molney island, where she maintained a speed of 8 knots an hour, and when traveling with her turret awash the speed is considerably over that. Afterward she was submerged to the depth of 15 ft. and for 6 miles the submarine ran under these conditions. The submarine was accompanied by the Furness railway's twin-screw tugboat Furness, with divers on board in case of emergency. The trials were conducted by Capt. Baron of the royal navy, and Capt. Cable, the celebrated submarine expert, who represents the inventors. The engineer officers and men attached to the Hazard have been instructed in the construction and mechanism of the submarine by Capt. Cable and Mr. Monell. The boat is of the improved Holland type, the patent rights of which throughout the world—except in the United States of America—have been purchased by Messrs. Vickers. The boat has a length of 63 ft. 4 in., with a diameter of 11 ft. 9 in., and a displacement of 120 tons when totally submerged. The hulls are divided internally into water-tight compartments by steel bulkheads. A 160 H. P. four-cylinder Otto gasoline engine is used for surface work. A 70 H. P. dynamo is run by the gas engine to store electricity when the boat is on the surface, and when going under, the gas engine is thrown out of gear and the dynamo is used as an electric motor, taking current from the cells it has stored. Should a torpedo be discharged from beneath the surface, trimming and ballast tanks, working automatically, compensate for the lessened displacement and maintain the ship in horizontal position. The submarine is capable of traveling 400 miles without exhausting the fuel supply, and to remain under water forty-eight hours at a stretch. Selected crews are to be trained this summer for the working of the new craft. Capt. Cable has now left for America.—Ernest Ashley in the Scientific American.

The Portland Ship Building Co., Portland, Me., is building a new passenger propeller for use on Rangeley lake, Me. The vessel is being put up on the shores of the lake and is for the Rangeley Lake Steamboat Co. She is 80 ft. over all, 19 ft. beam and 6 ft. depth of hold.

DEVICE FOR LOADING COAL ON VESSELS.

The C. O. Bartlett & Snow Co. of Cleveland has installed on the docks of M. A. Hanna & Co. at Ashtabula, O., a special type of carrier for loading coal, either hard or soft, on vessels. It is shown in the accompanying illustration and is operated as follows: The coal to be loaded into the boat is first loaded on hopper bottom railroad cars and drawn on the trestle shown in the illustration. The coal is dumped into a large iron hopper underneath the car, and over the lower end of the carrier, the coal being fed on the carrier by means of a large slide or opening 3 ft. square, opened and closed by power. The coal is then conveyed up this continuous carrier and delivered into the spout which feeds the coal into the boat from



CONVEYOR FOR LOADING COAL INTO LAKE VESSELS. Built by C. O. Bartlett & Snow Co., Cleveland.

the carrier. This spout is so arranged that it may be swung in any direction, thus doing away with the necessity of trimming the boat by hand, the coal being delivered at any point required. The upper end of the carrier is supported by a tower and is hung on a hinge, so that the upper end can be raised or lowered as desired. When it is desired to move the boat along the dock the upper end of the carrier can be hoisted high enough to be out of the way of the vessel and quickly lowered again. It can be raised to an upright position by the cable, if so desired, and be entirely out of the way of moving vessels. The spout for spouting the coal into the vessels from the carrier is made to telescope, so that as the vessel is filled with coal, the spout itself may be kept constantly full of coal, thus reducing to a minimum the breakage of the coal. The raising and lowering of the outer end of the carrier is an important feature of this loader as, by this means, it can be accommodated to any boat, while the breakage is a minimum, as the coal falls but a short distance. The whole carrier and mechanism pertaining thereto is operated by a 9 by 12 in. plain slide-valve engine, or in other words, it takes less than 25 H.P. to operate this entire coal loading machinery. Everything is necessarily made strong and substantial. This coaling device is operated by three men—one to take entire charge of the machinery, including the running of the engine; one to see that it is properly fed and one to operate the swinging or delivery spout. The conveyor was sold under a guarantee to load 600 tons an hour, but has loaded as much as 900 tons an hour. Its initial cost is very low.

PARTICULARS OF WELL-KNOWN SHIPS.

The following recent statistics regarding modern steamships of various classes have a special interest at this time:

I. BATTLESHIPS.

Ship.	Country.	Tons.	H. P.	Speed.	Date.
Glory	England	12,950	13,700	18.12 knots	1899
Barbarossa	Germany	11,233	13,000	18 knots	1900
Asalis	Japan	15,200	16,000	18 knots	1899
Wisconsin	United States	11,500	12,320	17.17 knots	1898

II. ARMORED CRUISERS.

Victor Hugo	France	12,146	27,000	22 knots	1901
Cressy	England	12,000	16,270	20.5 knots	1889

III. PROTECTED CRUISERS.

Variag	Russia	6,500	15,925	23.25 knots	1900
Minneapolis	United States	7,400	20,860	23.07 knots	1893
Blanco Encalada	Chile	4,570	14,500	22.80 knots	1893
Albany	United States	3,800	7,080	20.52 knots	1899

IV. COMMERCIAL VESSELS.

Deutschland	Germany	22,660	36,000	23.5 knots	1900
Campania	England	20,900	30,000	21.15 knots	1893
La Savoie	France	15,410	22,000	20.00 knots	1900

THIRD POWER CANAL AT THE SAULT.

A dispatch from Sault Ste. Marie announces that work on a third power canal (second on the Canadian side) will be started shortly by the Clergue syndicate. This third canal will increase the Consolidated Lake Superior Co.'s power to about 110,000 H.P. It is said that all the contracts for this canal will be let this summer and that heavy concerns are now making estimates. The canal will require the removal of 400,000 cubic yards of earth and 600,000 yards of stone and will be several years in building. This canal will provide power for a great metallurgical plant to treat ores of copper, zinc, silver and gold electrically. The ores for treatment are expected to come from western Canada and from the region to the north of the Sault where extensive developments are now in progress. Paper mills are also to be erected under this new power and contracts for the first of these, a very large plant to make news print, are already closed, it is said.

Contracts for a large amount of grading operations on the Manitoulin & North Shore railway, a Clergue enterprise, are to be made at once. These will be for the extension of the road in the nickel and copper country near Sudbury. This road is designed ultimately to form a link in the new transcontinental line of the Canadian Northern road, which now stretches west from Lake Superior into the far northwest on its way to the Pacific ocean. The Manitoulin & North Shore will be the link in this line connecting its rails north from Lake Superior with the Canada Atlantic east of Lake Huron. Tidewater is to be reached by the Canadian Northern via the Canada Atlantic and the government roads. By this connection the Clergue interests expect to secure what they need to render them independent of their interior position for export, that is, a direct route to the Atlantic under their own control. In this way they will be able to land export freight at the seaboard as cheaply as necessary. The new steel mills being erected at the Sault will require connection with tidewater in order to compete for European trade, which is the ultimate Clergue idea.

The steel rail mill of the Algoma Steel Co., another Clergue industry, has been given orders from the Canadian government amounting to 125,000 tons, and this week began rolling to fill the contract. The mill will get $32.50 per ton on the first 10,000 tons and going prices for the rest. It will also get a bonus from the government amounting now to $7 a ton on rails as well as bonus on pig iron. The plant will be making 1,000 tons a day in a very short time. It is stated that this is one of a very few rail mills ever built that started off making perfect rails at once.

The Canadian Rolling Stock Co. has just been formed by Mr. Clergue and associates, with a capital of $2,000,000, to manufacture rolling stock and locomotives. The company is already making flat cars and small engines.

JAPAN'S MERCANTILE MARINE.

The Japanese have ever been a race of sailors, although the curious fact emerges that their ships never reached the west. Centuries ago the hardy voyagers whose vessels swept the seas washing the shores of the "inland empire" were the Oriental counterparts of the Vikings, to whom western tradition has awarded the palm for adventurous and sturdy seamanship, and never, throughout all the years since the junks of the Empress Jingo were sent to invade Corea, has Japan failed to sustain its splendid reputation in this regard. Japanese history presents a parallel to the defeat of the Spanish Armada by the British; in 1272 the skilfully handled little junks of the Japanese so severely mauled the stately vessels of the Chinese that they were subsequently destroyed by the elements. As a result, the Japanese junks carried commerce to Corea and China, and to Annam, Siam, Luzon and Malacca.

In the sixteenth century Portuguese and Spanish ships visited Japan, and it is on record that besides imitating the European vessels, an Englishman of that period settled in Japan, and taught the natives ship building, etc. An edict of the Tokugawa era forbade the construction of ocean-going vessels, and for a time little progress was made, but in the nineteenth century the old order changed, giving place to the new, and the magnificent fleet of ocean-going vessels known as the Nippon Yusen Kaisha, which has now a fleet of seventy steamships, with a gross tonnage of 210,000 tons, came into being in 1885, through the amalgamation of rival lines. But this magnificent fleet, with its regular service with China, Asiatic Russia, the Straits settlements, India, the Red sea, Europe, Canada, America and Australia, by no means comprises the mercantile marine of Japan. In 1900 Japanese shipping was composed of 846 steamers, of 528,321 tons, and 3,280 sailing vessels, of 304,161 tons, giving a total of 4,126 vessels and 832,482 tons in all. A steady increase is taking place both in the numbers and tonnage of vessels flying the Japanese flag, and the Japanese are showing unwearied zeal in the development of their mercantile marine.

IN MEMORY OF THE GRIFFON.

In the village of La Salle, a suburb of Niagara Falls, a monument was dedicated on Saturday last to the memory of Cavalier De La Salle, the French explorer, who in May, 1679, built the Griffon, the first vessel known to have sailed the upper lakes. In December, 1678, La Salle landed at the mouth of the Niagara river, on the spot now known as Fort Niagara. He secured from the Seneca chieftains permission to build a vessel to navigate the inland waters, and after setting his men at work on her construction, he left for Fort Frontenac, traveling on foot. When he returned in the spring of 1679 he found his trading post at Fort Niagara in ashes, and he looked to the trading facilities offered by this vessel to redeem his lost fortunes.

The site of the construction of the vessel has been located as nearly as possible on the farm of Jackson Angevine, close to the Little Niagara river, and there on Saturday a magnificent bowlder monument was erected. This monument stands less than 100 ft. from the water. It has been given position close beside the fence line, in full view of passengers on the steam cars and trollies. It is a mammoth stone, many feet in circumference, and just such a rugged monument as one might conceive La Salle would pick for himself in commemorating the birth of the commerce of the great upper lakes. On the stone there is a bronze tablet, on which is inscribed:

"Hereabout, in May, 1679,
Robert Cavalier De La Salle,
Built the Griffon of sixty
Tons Burthen, the First Vessel
to Sail the Upper Lakes.

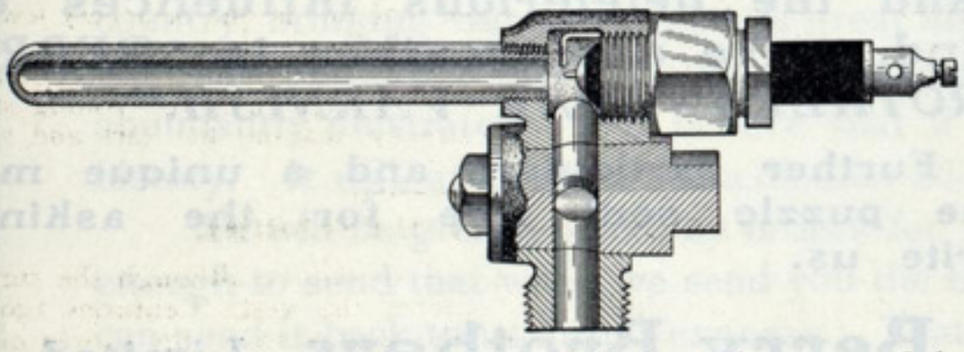
Erected by
Niagara Frontier Historical Society
and presented to
Niagara Landmarks' Association
May, 1902."

The ceremony was attended by a large crowd, all interested in the historical work of western New York. President Avery of the Buffalo Landmarks' Association was the master of ceremonies. The exercises opened with an invocation by Father Grace of Niagara university. The transfer of the bowlder site, and the presentation of the bowlder and tablet to the Niagara Landmarks' association followed, Hon. Peter A. Porter, president of the Niagara Falls Historical society making the presentation speech. Mrs. John Miller Horton of Buffalo unveiled the monument, and it was accepted by Mr. G. D. Emerson, speaking for the Landmarks' association. An address of an historical nature was delivered by Dr. T. B. Lovell. A poem was read by Mr. Charles W. Wilcox, and Herbert P. Bissell of Buffalo spoke. "America" was sung under the leadership of Hon. George A. Lewis, and then Father Grace pronounced the benediction.

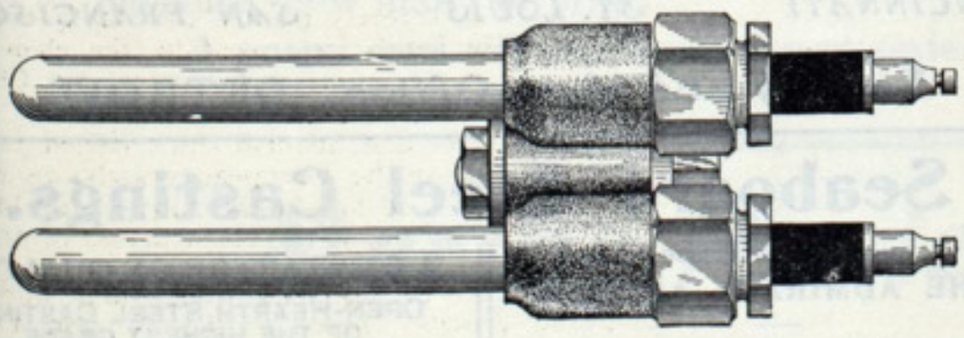
The placing of this monument is the first step in marking many places of historical interest in western New York.

THE COTTON DUPLEX IGNITER.

This device consists of a Y-shaped brass casting, containing a three-way valve and two receptacles for the standard jump-spark plugs now on the market. The nipple is made to fit ½-in. pipe thread, but can be furnished to order in any thread and size. A tube, closed at one end, extends from each plug orifice and is of sufficient length to act as a compression chamber, into which the burnt gases remaining around the spark-plug are forced by the compression of the charge in the engine cylinder,



thus providing that the sparking points shall always be surrounded with fresh gas and thus insure the ignition of the charge. The rushing back and forth of the gases into and out of the compression chamber keeps the points clean. Deposits of carbon on the points from improperly mixed charges of gas are said to be impossible with this device. Duplicate chambers are provided, connected with the engine by a three-way



valve, so that in case one spark-plug is not working properly it may be cut off and the other one thrown in without stopping the engine; the other being then taken out and examined at leisure, or a new one substituted. The cuts show a front view of the device and a section through one chamber and the three-way connection to the engine. The device can be attached to any engine and is being placed on the market at a low price by the Automobile Equipment Co., 21 Quincy street, Chicago.

M. B. McDonald, Mystic, Conn., will build a five-masted wooden schooner for Capt. Lucius J. Stevens of Clinton, Conn. Her dimensions are: Length, 240 ft.; beam, 46 ft.; depth of hold, 21 ft.

ATLANTIC COAST SCHOONERS.

Some interesting information regarding schooners of the Atlantic seaboard (nearly all of them wooden vessels, of course), has been compiled from government records by the Maritime Journal. There are 1,233 schooners of over 100 tons gross owned on the Atlantic coast. Of this number 1,111 are of less than 1,000 tons gross and 122 range from 1,000 to 3,500 tons. Nineteen are above 2,000 tons, and only one, the Eleanor A. Percy, a six-master, is above 3,000 tons. Following are the names and tonnage of the largest of these vessels:

Name.	Gross tons.	Name.	Gross tons.
Eleanor A. Percy	3,401	Frank A. Palmer	2,014
George W. Wells	2,970	Jennie French Potter	1,993
Prescott Palmer	2,811	Marie Palmer	1,904
Baker Palmer	2,792	Mary F. Barrett	1,833
William C. Carnegie	2,663	James W. Paul, Jr.	1,808
Rebecca Palmer	2,556	Henry O. Barrett	1,807
Nathaniel T. Palmer	2,440	William B. Palmer	1,805
Cora F. Cressey	2,409	Governor Ames	1,778
Oakley C. Curtis	2,374	Jacob M. Haskell	1,778
Helen W. Martin	2,265	S. P. Blackburn	1,756
Fannie Palmer	2,258	Maude Palmer	1,745
Louise B. Crary	2,231	Malcolm Baxter, Jr.	1,732
Jennie R. Dubois	2,227	James Pierce	1,664
Arthur Seitz	2,207	Henry W. Cramp	1,629
Martha P. Small	2,178	Alice E. Clark	1,621
Mary W. Bowen	2,153	Edward E. Briry	1,613
Van Allens Boughton	2,129	Alice M. Colburn	1,603
M. D. Cressy	2,114		

Six-masted vessels in the foregoing list are the Eleanor A. Percy and George W. Wells. All other vessels in the list above 2,100 tons carry five masts. Some of the vessels of less than 2,100 tons also carry five masts, but the four-mast rig prevails when the tonnage is less than 2,100. There are in all twenty-two five-masted schooners.

Less than 100 full-rigged ships fly the American flag.

Of four-masted schooners there are 161 owned on the Atlantic coast.

The largest two-masted schooner is the Oliver Ames, 456 tons.

The smallest four-masted schooner is the Massachusetts, 501 tons gross.

The first two-masted schooner was built at Gloucester, Mass., in 1714.

The largest four-masted schooner afloat is the Frank A. Palmer, 2,014 tons gross.

The first three-masted schooner was the Zachary Taylor, built at Philadelphia in 1849.

The largest three-masted schooner on the ocean is the Bradford C. French, 968 tons gross.

The smallest five-masted schooner on the Atlantic is the James Pierce, 1,664 tons gross.

The largest five-masted schooner in the world is the Prescott Palmer of Boston. She registers 2,811 tons.

The largest full-rigged American ship is the Roanoke, 3,539 gross tons, and the smallest, the Dashing Wave, 1,054 tons.

The oldest schooner over 300 tons gross register is the two-master Eliza S. Potter, built at Mystic, Conn., in 1857.

The largest American brigantine is the C. C. Sweeney, 622 tons gross register, and the smallest, the D. A. Small, 119 tons.

The largest American barkentine is the James Tuft, 1,274 tons gross register, and the smallest, the Monitor, 235 tons.

The largest American bark is the J. B. Walker, 2,178 gross tons, and the smallest, the President, 123 tons, she being a whaler.

The four-masted schooner Elliott B. Church, was the first schooner over 1,000 tons gross register ever built. She was finished in 1882.

The first four-masted schooner was the W. L. White and the second the Francis C. Yarnall. The White was built in 1880 and the Yarnall in 1881.

The new seven-masted schooner building for John G. Crowley will be the first steel schooner ever built in this country and the first seven-master ever built in the world.

The largest schooner in the world at the present time is the Eleanor A. Percy of Bath, Me. She registers 3,401 tons gross and has six masts. The only other six-master afloat is the George W. Wells of Boston. She registers 2,970 tons gross.

Ship yards in Bath, Me., are all busy. At the Kelley, Spear Co.'s yards the Maine Central passenger company's steamer Norumbega was launched last week. The four-masted barge Santiago, building for the Staples Coal Co., Taunton, Mass., is three-fourths planked, is decked, has her masts in position and part of her rigging up. The schooner, building for Charles H. Hirsch & Co., New York, is one-half framed. The keel is stretched for a 200-ft. barge for the Hudson Bros., Norfolk, Va. The New England Co., Bath, Me., is building a four-masted schooner for Capt. J. E. Higbee, to be christened Robert H. Stevens. The keel is laid for one of the barges for the Baltimore & Boston Barge Co. She is to be 225 ft. long, 35 ft. beam and 18 ft. deep. This barge will be launched some time during the month of August. The three-masted schooner Alice M. Davenport, building for Capt. M. D. McKeown of Boothbay, Me., is framed and partly planked. As soon as she is launched the keel for another schooner will be stretched. At the works of Arthur Sewall & Co., Bath, Me., the large steel oil barge for the Standard Oil Co. is half completed. The work on the five-masted steel schooner to be managed by the firm is now at a standstill. At the Bath Iron Works the battleship Georgia is progressing finely. The keel for the oil barge for the J. M. Guffey Co. is nearly all stretched. Work on the dock gates for the Kittery navy yard has begun. The armor for the monitor Nevada is being put on and the two 12-in. guns are aboard. Masts for the cruiser Cleveland will be placed in position as soon as the wooden top-masts are made. The old Reed ship yard will be used by Mr. Crosby to build a four-masted schooner in. Work upon the schooner will begin in a few days. William Rogers, Bath's veteran ship builder, closed a contract this week with Capt. Slocum of Somerville for a four-masted schooner. Capt. James W. Hawley's schooner, building in the Houghton yard, is to be called the Fred A. Davenport.

ITEMS OF GENERAL INTEREST.

It is reported that the Lamport & Holt line is about to place six additional steamers upon its service between New York and Rio de Janeiro. Two of the steamers will be of 5,000 tons and four of 6,350 tons burden.

Rear-Admiral Endicott, chief of the bureau of yards and docks, has approved the specifications for the proposed concrete dock in Norfolk, and is giving final examinations to the plans for the dry docks in New York and Charleston. These docks will be 600 ft. in length and will have a draught of 32 ft.

A certificate of incorporation has been filed at Dover, Del., for the Tampico Navigation Co. of New York, to conduct a general navigation business in Mexico. The incorporators are: Charles F. Deganall, Tampico, Mex.; W. H. Hunt, Charles Francis Phillips, New York; W. H. Highlands, Chicago. The capital stock is $1,000,000.

The largest chain in the world (illustrated and described in a recent issue of the Review) was shipped this week from the Lebanon Chain Works at Lebanon, Pa., to the Eastern Ship Building Co., New London, Conn. The shipment represents one-half of the order, which is for 660 fathoms of 3 3/16-in. diameter chain. Each link measures approximately 19½ in. in length and about 11½ in. in width and weighs about 100 lbs. to the foot, so that the total tonnage represented will equal about 215 tons. The chain is for the new Hill Pacific steamers building at New London.

Trials ordered by the boiler committee of the British admiralty on the Seagull, the only ship fitted with the Niclausse water-tube boilers, have been concluded. At the 1,000 H.P. trial for eight hours the coal consumption was 2.28 lbs. per horse power per hour, and the make-up feed-water .32 lb. At the eight hours' 3,000 H.P. trial the coal consumption was 2.15 lbs., and the make-up feed-water .67 lb. The vessel next started on a fifty-hours' trial at 2,500 H.P., and for the first eighteen hours the coal consumption was 2.14 lbs., and the make-up feed-water .35 lb. The trial was then interrupted for six hours owing to fog, and was resumed for nineteen hours at 2,300 H. P., when the coal consumption was 2.47 lbs. and the make-up feed about the same as before.

The first important duty of Mr. Squiers, the new minister to Cuba, is to enter into negotiations with the Cuban government to secure the fulfillment of the pledge in the Cuban constitution that the United States shall be allowed sites for coaling stations on the island. These sites have already been tentatively selected by the state and the navy departments, but it will rest with the Cuban government to say whether they shall be ceded. The administration wishes to establish one of the stations in Havana harbor, and it is expected that there may be some opposition to this on the part of the Cuban authorities. To forestall such opposition to any site in Havana proper, a place across the bay from the city has been chosen if there is strong objections to an American fortification on the city side. This government wants three other stations in Cuba—at Nipe bay, Guantanamo and Cienfuegos.

The steamer Enterprise, pioneer deep-water oil-burning steamship in the Pacific, returned this week from Hilo, Hawaii territory, to San Francisco, completing her initial round trip with the new fuel. She was fitted with tanks and oil-burning furnaces as an experiment. As many vessels sailing under other flags, particularly the Black sea mercantile fleet of Russia, have successfully used fuel oil for several years past, no doubt was entertained of the success of the Enterprise. Her tanks carry 750 tons, or 3,000 barrels of crude oil. They were supposed to have sufficient capacity to carry her the round voyage. The estimate was a correct one, for she reached port with a full cargo of 2,500 tons of sugar and enough crude oil still in her tanks to carry her a long distance further. The trip was made on schedule time each way. Not only has the fuel bill of the Enterprise been greatly reduced, but the voyage was made with a crew of three firemen instead of twelve employed when the vessel was a coal burner.

The report of the Tennessee Coal & Iron Co. for the quarter ended March 31 was made public this week. While the earnings for the first three months of the year show an improvement as compared with the report of the company for the year ended Dec. 31 last, still they by no means justify a resumption of dividends on the common stock. The net earnings for the quarter aggregated $368,060, which is equivalent to about 6½ per cent. on the outstanding $22,300,000 common stock. After setting aside $118,333 for depreciation and $4,966 dividends on the preferred stock, there remains a balance of $245,061, or about 4 per cent. on the common stock. The net earnings of the Tennessee Coal & Iron Co. for the year ended Dec. 31 aggregated $863,448, or not much over 3½ per cent. on the outstanding common stock. After setting aside reserve, insurance and other funds and the payment of the preferred dividend, there remained a balance for the year of only $243,809.

"BENEDICT-NICKEL" Seamless Condenser Tubes
are the only ones that resist electrolysis.
Far superior to brass or copper.
Our treatise on "Electrolysis of Condenser Tubes" tells why—send for it.
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COMPAGNIE GÉNÉRALE TRANSATLANTIQUE

FRENCH LINE—UNITED STATES AND EUROPEAN MAIL ROUTE.

New York to Havre-Paris in less than one week.
Steamers sail from New York every Thursday, at 10 a. m.
Company's own vestibuled train from Havre to Paris in four hours.
FLEET 70 STEAMERS.

In New York service the following gigantic Twin Screw Steamers:

"LA LORRAINE"	(new)	Twin Screw		15,000	tons	22,000	H.P.
"LA SAVOIE"	(new)	"	"	15,000	"	22,000	"
"LA TOURAINE"	(modern)	"	"	10,000	"	12,000	"
"L'AQUITAINE"	(modern)	"	"	10,000	"	16,000	"

Naval officers command above steamers, insuring the same strict discipline as on a man-of-war. These ships all have double bottoms and water-tight compartments, and prescribed routes are taken to avoid fogs. The above steamers contain every modern twentieth century equipment for safety, most luxurious accommodations, and the cuisine is famous. The favorite route of the elite of both continents. For rates, plans and other particulars apply to

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which, upon being mixed with water, becomes a hard metallic **IRON,** that is insoluble in water, steam or oil, withstands fire and expansion and contraction—being the same as iron is why it is sometimes called **MAGIC IRON.**

When applied to a blemish in a casting the blemish is removed. Hundreds of breaks or fractures in hydraulic machinery, leaks in connections in steam or water work, have been permanently and cheaply repaired with **SMOOTH-ON.**

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"THE ADMIRAL" ANCHOR.

THE LATEST AND BEST STOCKLESS ANCHOR.
APPROVED BY LLOYD'S.

ANCHORS CAST AND TESTED ON ORDER, OR STOCK ORDERS PROMPTLY FILLED.

A GUARANTEE OF QUALITY.

OPEN-HEARTH STEEL CASTINGS OF THE HIGHEST GRADE.

FACILITIES FOR CASTINGS UP TO 80,000 POUNDS WEIGHT.

MACHINE WORK AND PATTERNS FURNISHED WHEN REQUIRED.

RAIL OR WATER DELIVERIES.

CAPACITY, 1500 TONS PER MONTH

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A HISTORY OF THE LAKE SUPERIOR IRON COUNTRY

THE MARINE REVIEW RECENTLY PUBLISHED A BIOGRAPHY OF THE HON. PETER WHITE, OF MARQUETTE, MICH., WHICH ATTRACTED WIDESPREAD ATTENTION THROUGHOUT THE COUNTRY, AND RESULTED IN A QUICK SALE OF THE ENTIRE ISSUES IN WHICH IT WAS PUBLISHED.

There were two reasons for this: The first was that the personality of the HON. PETER WHITE is fascinating and that it has been given to very few men to live the life which he has lived. He went into the upper Peninsula of Michigan almost immediately upon the discovery of iron ore, and, as a slender stripling, assisted in the exploitation of the first iron mine. He penetrated the trackless wilds with Indians and dog sleds to fetch and carry the mails and in an hundred ways he sought to develop this wonderful iron country. His life is *romance;* it is high light against the background of the greatest industrial revolution that the world has ever seen. It is these great deposits of iron in the Lake Superior country which have made the United States the great manufacturing nation that it is. They have literally moved the world's steel-making center west of the Allegheny mountains. Peter White's manly, sturdy life has continually been a part of this procession of progress. This is the first and great reason for the avidity with which the biography was seized upon. The second reason is that the biographical sketch contained a complete and authentic history of the Lake Superior iron country, bringing out many facts of great historical significance never before published.

The MARINE REVIEW proposes now to amplify the biography and to bring it out in book form, abundantly illustrated. We believe that it will add a new and interesting chapter to American history. It will, at any rate, be a distinct addition to the literature of the great state of Michigan.

We will be greatly aided by orders for the book now, *but don't send any money.* It will be time enough to send that when we send you the book. If you don't want the book when you see it, you can send it back to us at our expense. That's fair, isn't it?

We don't know yet what the book is going to cost us; but it won't cost you over *One Dollar* anyhow, and probably not more than *Fifty Cents.*

May we have your order? We would like it now because it will enable us to determine, in a measure, how many to print.

A postal card will serve you for an order.

Marine Review Publishing Co.

39-40-41 WADE BUILDING

CLEVELAND, O.

"PRESERVO" WILL NOT CRACK, SCALE, FREEZE OR STICK—SEE PAGE 8.

MR. SCHWAB'S BEAUTIFUL CHARITY.

In order to correct numerous misstatements in regard to his recent purchase of Olean beach property on Staten island for the benefit of poor children, Charles M. Schwab, president of the United States Steel Corporation, has made the following statement in regard to the investment:

"I have purchased Richmond beach, facing New York bay, on the south shore of Staten island, near Tottenville, for the benefit of poor and sick children of New York. The land comprises about a quarter of a mile of fine beach; also a fine fresh water lake, a grove and high land reaching back to the Richmond road. The improvements on the property at present consist of a farmhouse, pavilions on the ocean shore, pagodas and a large steamboat dock. These buildings will be altered to suit the purposes of the purchase, after consultation with charitable institutions of New York. It is expected that from 1,500 to 2,000 children daily can be provided for at the beach, and they will be given a good time in the usual way, by means of bathing, boating, boating on the lake, rides on donkeys, games in the fields and the grove. The children will be conveyed to the beach probably on a large steamer, and the outings will continue during the open air season. Every child will receive a good dinner. Mrs. Schwab is closely interested with me in this undertaking and we both have our hearts in it. We shall proceed carefully in all respects, availing ourselves of the benefit of the experience of charitable organizations. There are no marshes near this beach, and I regard it as one of the finest properties for the purpose that could be purchased anywhere."

TRADE NOTES.

A note in the last issue of the Review referred to a band saw that was shipped by the Atlantic Works Incorporated of Philadelphia to the boat yard of Mr. Herbert Garison, Bridgeton, N. Y. A mistake was made in the name of the state. Mr. Garison's works are at Bridgeton, N. J.

Eleven 15 H.P. and three 40 H.P. Westinghouse 500-volt, shunt-wound, direct-current motors were recently purchased by the Boston & Montana Consolidated Copper & Silver Mining Co., to be added to electrical equipment in its smelters and refineries at Great Falls, Mont. About four years ago this company installed a number of Westinghouse 180-volt, electrolytic generators and at the same time put in a large number of Westinghouse and other motors for driving ventilating fans and other machinery about the smelters. Although the smelters are filled with sulphur dust and are extremely dirty, the Westinghouse motors have given excellent satisfaction. Officials of the Boston & Montana company say that the commutators of the Westinghouse motors are sufficiently insulated between bars to prevent bad grounds.

A booklet in the way of twenty-four advance pages of catalogue has just been issued by Marine Iron Works, Station A, Chicago, which they will send free on request. It contains much interesting reading matter, as also illustrations and details of the latest design of marine engines, all of value to those who may contemplate the purchase of such work. 2

Vessel Property Wanted.

Wanted—Vessel property to be paid for in Chicago real estate at cash prices. Will take sailing vessel, barge or steamer. Might put in part cash. Address, giving full particulars. W. T. Farwell, Room 211 Oxford Bldg., Chicago. June 5

Steam Yacht for Sale.

Steam yacht, 35 ft. over all, 7 ft. beam; burns kerosene; has electric light; is in first-class order. J. L. Alberger & Son, Ellicott Square, Buffalo, N. Y. May 22.

Position or Partnership.

A ship and engine builder, with a thorough experience in all branches of the business, both theoretical and practical, and with a reputation that compares favorably with that of any ship builder in the country, is desirous of opening negotiations with persons anxious to engage the services of a strictly first-class man, either to start a new yard of the most advanced type, or with a view to developing an established plant along the lines of the most economical policy known to American ship building. Experienced in all types of steamships, including battleships, cruisers, torpedo boats, Atlantic liners, yachts, etc., and particularly equipped for the construction of cheap and economical freighters and tramp steamers.

As an evidence of good faith I am willing to invest $20,000 with my services in a promising concern that will bear the strictest investigation. No small offers considered.

Address MANAGER OF SHIP YARD,
Care of Enoch W. C. Greene, Attorney-at-Law, 333 Walnut St., Philadelphia, Pa.

Sailing Vessel Wanted.

Vessel of 200 tons; 10 ft. draught, loaded; centerboard. Address P. O. Box 72, Mobile, Ala. May 29.

Scotch Boiler For Sale.

Scotch boiler, 14 ft. diameter by 13 ft. Lying at Detroit Ship Building Co.'s Works. Address James Corrigan, 41? Perry-Payne bldg., Cleveland. tf.

Engine and Boiler Wanted.

Wanted—A 14x16 or 16x16 marine engine; also boiler of sufficient capacity to supply steam for same at not less than 125 lbs. pressure. Address 407 Chamber of Commerce building, Toledo, O. May 29.

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Originated 1849

Hors Concours 1900
Latest Patents 1902

Number of Nautical Miles made each year by Steamships of the Messageries Maritimes Co., Provided with Belleville Generators—Since their Adoption in the Service.

Year.	Australien	Polynésien	Armand Béhic	Ville de la Ciotat	Ernest Simons	Chili	Cordillère	Laos	Indus	Tonkin	Annam	Atlantique
1890	67,728	2,460										
1891	68,247	68,331	204									
1892	68,247	68,403	69,822	23,259								
1893	68,379	68,343	68,286	68,247								
1894	68,439	68,367	68.574	68,439	37,701							
1895	68,673	68,766	68,739	68,808	40,887	28,713						
1896	69,534	92,718	69,696	69,549	62,205	63,153	40,716					
1897	68,250	69,606	92,736	69,555	62,235	76,110	63,357	43,146				
1898	70,938	69,534	69,552	69,597	62,526	63,240	63,240	62,553	63,954	22,707		
1899	69,534	69,615	67,431	90,405	60,246	62,778	62,868	52,344	54,855	44,007	22,884	
1900	69,534	67,494	69,744	69,564	61,719	62,382	62,502	51,471	53,373	62,016	63,066	52,140
1901	44,220	69,627	69,594	66,948	51,057	62,460	62,490	61,743	62,688	43,866	62,466	63,126
Total	801,723	783,264	714,378	664,371	438,576	418,836	355,173	271,257	234,870	172,596	148,416	115,266

ATELIERS ET CHANTIERS DE L'ERMITAGE, À ST. DENIS (SEINE), FRANCE.
WORKS AND YARDS OF L'ERMITAGE AT ST. DENIS (SEINE), FRANCE.

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